
THE VIRGINIA TEACHER

November-December, 1929



PRESENT CLIMATE NOT CHANGING

HOW ANIMALS BECAME THEMSELVES

ANCIENT HISTORY IN THE PLANT WORLD

CREATING INTEREST IN BIOLOGY

OBJECTIVES IN BIOLOGY

BIRD STUDY

THE READING TABLE

ALUMNAE NEWS

PUBLISHED AT THE
STATE TEACHERS COLLEGE
OF HARRISONBURG, VA.

15 CENTS

Do You Teach Your Students to Make the Proper Use of Their Shorthand and Typewriting Skill?

Skill in typewriting and writing and reading skill in shorthand, are fundamental, but if these skills are to be made commercially valuable, they must be applied to the solution of practical office problems.

To aid you in the solution of the many problems involved in this "second step" we offer you a series of three scientifically prepared books.

RATIONAL DICTATION

(McNamara and Markett)

480 pages; cloth, \$1.40

505 business letters and 56 articles, rich in business procedure and cultural content. Graded according to syllabic intensity. This material is intended to develop the student's shorthand vocabulary, and to aid in the gradual development of dictation and transcription skill.

RATIONAL TYPEWRITING PROJECTS

(SoRelle)

208 pages; cloth, \$1.20

180 practical projects intended to teach students the ordinary uses of the typewriter in the business office. The solution of these problems is equal to a year's training "on the job."

SECRETARIAL STUDIES

(SoRelle and Gregg)

TWO EDITIONS

Complete Text, 416 pages, \$1.40

Laboratory Materials, Pad Form, .60

Intensive Course (including text and Laboratory Materials in one Pad), \$1.60

A "finishing course" that covers thoroughly the duties and responsibilities of the stenographer or secretary. This course presupposes a practical skill in both shorthand and typewriting. Easily taught and intensely interesting and practical.

Teacher's Manuals to both Rational Typewriting Projects and Secretarial Studies

We prefer to have you read these books rather than to read about them. So if you have an advanced stenographic problem, ask our nearest office to send you a sample of the books in which you are interested.

The Gregg Publishing Company

New York Chicago Boston San Francisco Toronto London

DR. WALTER T. LINEWEAVER
DENTIST

Peoples Bank Building
HARRISONBURG, VA.
Phones: Office, 85; House, 85-M

ARCHITECTS DESIGNERS

The Neilsen Construction Co.

BUILDERS AND BUILDERS SUPPLIES

Harrisonburg, Virginia
Phone 142 Office 90 E. Market St.

S. BLATT

FINE MERCHANT TAILOR

CLEANING DYEING PRESSING

NEW MODERN MACHINERY

East Marker St. Harrisonburg, Va.

ATTRACTIVE POSITIONS

for 1927-'28 are being reported.
Free registration, four offices.

SOUTHERN TEACHERS AGENCY
Richmond :: :: Virginia

D. C. DEVIER'S SONS

Reliable Jewelers

Harrisonburg :: :: Virginia

A FOOD

AND

AN ENERGY BUILDER

IMPERIAL

THE CREAM of all ICE CREAMS

Manufactured
in

Harrisonburg, Va.

and sold by all leading Ice Cream
dealers throughout
the

Shenandoah Valley

S. BRADLEY & SONS, INC.

Iron Founders and Machinists

240 S. High St. Harrisonburg, Va.

BECK'S

For HEALTH'S SAKE

Eat SALLY ANN BREAD

made in the

Shenandoah Valley—Nature's Picture
Land—We Feed It

ENDLESS CAVERNS

WONDERFUL AND SPECTACULAR

NEW MARKET, VIRGINIA

OPEN DAY AND NIGHT THROUGHOUT THE YEAR

BEGUN—No man knows when

END—No man knows where

Tea Room Service at All Hours

Descriptive Booklet Mailed on Request

CONTENTS

Ancient History in the Plant World	<i>M. Dorisse Howe</i>	277
How Our Animals Became Themselves	<i>Ruth Phillips</i>	280
Creating Interest in Biology	<i>Sadie S. Williams</i>	283
Bird Study	<i>George W. Chappellear</i>	287
Determination of Objectives in Biology Teaching, Past and Present	<i>Bertha M. Wittlinger</i>	290
Present Climate Not Changing	<i>Raus M. Hanson</i>	295
Educational Comment		299
The Reading Table		302
News of the College and its Alumnæ		304

\$1.50 a Year Published Monthly except August and September 15 Cents a Copy

THE VIRGINIA TEACHER is indexed in the *Education Index*
published by the H. W. Wilson Co.

Hutton Webster's HISTORY OF MANKIND

A short history of civilization for a one year high school course.

The History of Mankind is a social history emphasizing the cultural and economic development of human society.

It is a broad account of human progress with a practical bearing upon modern civilization, giving to the study of general history a life value for the present day student. *Illustrated.*

D. C. HEATH AND COMPANY

239 West 39th Street
New York City

THE VIRGINIA TEACHER

VOLUME X

NOVEMBER-DECEMBER, 1929

NUMBER 9

ANCIENT HISTORY IN THE PLANT WORLD

PLANTS of the present have received much attention, but plants of the past are just coming into prominence. And by plants of the past we mean not plants of a hundred years or so ago, but plants of a hundred million years ago. It is generally known that coal was formed by plant deposits of long ago, many of which were ferns. The idea that ferns formed a large part of the coal came from the fact that the impressions found in the coal looked like the leaves of present-day ferns. Impressions are the marks left by decayed leaves or stems of which the substance is reduced to carbon in which there is no structure preserved. Recently, botanists have begun to study the plant remains found in calcareous balls. These balls, known as "coal balls," are found in connection with coal deposits. In the balls the cellular structure of the plants is preserved by a chemical replacement in which the chemical constituents of the cells are replaced by calcium compounds. Thus, the cell structure of the plants of many thousand years ago may be studied with certainty. The technique of making slides of fossil plants is very different from that of making slides of living plants. The coal balls must be cut with a saw charged with diamond dust. The slabs which are cut off the balls are relatively thick. They are mounted on marble slabs with shellac or Canada balsam, and then ground down to a thickness of about a thirty-second of an inch, after which they are remounted on glass slides and ground with progressively finer carborundum powder until they are transparent.

Study of these sections reveals some very

interesting facts. At one period of geologic history, the Pteridophytes or "ferns and their allies" were very prominent and grew to giant size. The fossil ground pines grew to a height of seventy or eighty feet with a considerable development of secondary wood, whereas their present-day descendants are prostrate forms or do not grow much over ten inches high in temperate regions. The same relationship holds for the horsetails, or "scouring rushes." The fossil horsetails were large forms, and with the fossil Lycopods (ground pines) formed a large part of the fossil swamp flora. The fossil horsetails are especially interesting in that they had already advanced to the condition of an endarch siphonstele, which is still the most advanced type of stele, a condition which at the present time is found only among the seed plants with the exception of the present-day horsetails.

Another interesting fact that has developed from the study of coal balls is that almost all of the supposed fern fronds found in coal are now considered to belong to the "seed ferns" or seed-bearing plants with fern-like leaves. We know that this is true because these fern-like fronds have been found with seeds attached—seeds which resemble in structure the seeds of our modern "evergreen" or coniferous trees.

Imagine then what a swamp might have looked like a few hundred million years ago. The fossil Lycopods were something like the palms in general shape—their trunks were bare to a height of sixty feet or more and this trunk was topped by a dichotomously branching mass of small branches which bore long narrow leaves and long slender cones. Some of the Lycopods

pod trunks were marked with diagonal rows of diamond-shaped leaf scars, and some others were marked with vertical rows of circular leaf scars. Growing among these Lycopods were fossil horsetails. These horsetails were of the same general shape as the horsetails of today. They had a long central axis from which the branches went out in whorls—a ring of branches going out of the main axis. These trees had cones too, but they were shorter in proportion to their width, and the leaves were shorter and less prominent. The bark of these trees was ridged. The horsetails and Lycopods probably all grew in shallow water or at the edge of the water in much the same way that the present-day alders and swamp maples grow. There is another interesting plant which is found associated with the Lycopods and horsetails. It was a slender plant which had leaves much like a four-leaved clover. At the present time there is a dispute as to whether this form was a climbing plant or a water plant. The cross section of the stem of this plant is one of the most beautiful of all stem sections. The stele is a triarch protosteles, and the secondary wood opposite the protoxylem is much smaller than the rest of the secondary wood, making a very beautiful pattern. The technical name of this plant is *Sphenophyllum*.

There you have the outstanding forms of that paleozoic swamp. Now imagine that swamp with the large amount of debris of fallen logs, branches, and dead leaves which you find in an ordinary swamp of today. These logs and branches lay for many years slowly sinking into the mud and partly decaying. The outer bark was often destroyed, leaving only the wood, or perhaps the bark remained but the more delicate tissue between the bark and wood was destroyed. Often the fallen logs served as places of anchorage for young plants, consequently we often find that the preserved material has been penetrated by numerous

small roots of plants which were growing on it. As these logs and branches sank deeper and deeper into the mud, parts of them were replaced by calcium compounds and thus turned into stone, while other parts were turned into coal. Sometimes the outline of a leaf or stem was preserved in limestone, but the actual plant material was reduced to structureless carbon. We call this kind of fossils "impressions" because only the outline or shape is left imprinted upon the limestone.

A very good idea of the process of coal formation might be gained by a visit to a peat bog. Peat bogs are undrained swamps in which the plant material only partially decays, and is deposited at the bottom of the bogs. In a young bog there is a deep body of water in the center. Plants gradually grow out on the surface of the water, forming a quaking mat. As the plants on the mat increase in size the mat begins to sink and eventually adds to the deposit on the bottom. After this a new mat forms. This process is continued until the bog is filled up—a process covering hundreds of years. This deposit of partially decayed plant material is called peat and is used for fuel in many rural communities of Europe. Peat formation is the first step in coal formation. Further development into coal is brought about by added pressure from above through many centuries until the peat is changed into coal and the materials found associated with it. The coal which we use now was formed in the carboniferous period of the paleozoic age.

A remnant from a later period of geologic history is the Ginkgo or Maidenhair tree. This tree is fairly common in parks and may be found along several of the streets of Washington, D. C. It is frequently referred to among botanists as "the tree which should have become extinct long ago," and the interesting thing about it is that it would have become extinct if left to itself. One of the Chinese traditions is

that the Ginkgo tree is a sacred tree, and for that reason it has been kept alive all these years because it has been cultivated in the Chinese temple gardens. It has repeatedly been reported as growing wild, but in every case, subsequent investigations have revealed the existence of temple ruins around the site of the "wild" Ginkgo trees. And so, thanks to a Chinese tradition we have this living representative of an age from which everything else has become extinct.

Probable direct descendants from contemporaries of the Ginkgo tree are the Cycads. These interesting plants have a very peculiar distribution—of the nine genera still living, four are found only in the western hemisphere and five in the eastern hemisphere. The Cycads are cultivated somewhat as greenhouse plants and are usually erroneously called palms. One of them, *Cycas revoluta*, an eastern hemisphere genus, is used quite extensively in funeral sprays and Palm Sunday decorations. All of the forms are tropical or sub-tropical. The fact that they are so widely distributed and so isolated, together with the fact that similar forms were much more prominent in an earlier period is evidence that they are gradually becoming extinct.

The present-day conifers are a remnant of a once more prominent group. Almost the oldest fossil deposits found contain fragments of coniferous trees—in fact, the seed ferns mentioned before were really ancestors of the present-day conifers. So we see a steady waxing and waning of forms. The Lycopods which were once the most prominent type of vegetation are now in grave danger of becoming extinct, so lavishly and carelessly are they used for ornamental purposes in Christmas wreaths and ropes. It almost seems that in the light of the antiquity of these forms they might be treated with a little more respect. The horsetails are more prominent at the present time than the Lycopods and probably

owe their present condition to the fact that they are particularly adapted to subsist and propagate themselves in situations in which the competition from other plants is not very keen. One group of present-day plants has not been found in very old fossil deposits, and that group is the one known as the flowering plants. Whether this fact indicates that the group has developed from some other forms recently or whether it indicates that flowering plants grew in past ages under poor conditions for preservation is a matter for conjecture and dispute. The modification of form which some types have undergone, the diversity of types and the prominence of the group would lead to the opinion that the group is of considerable age, because of the probable length of time necessary for these changes to have taken place.

Glaciation seems to have been an important factor in the distribution of plants; at least in the more northern parts of the world. At one time the northern part of North America was probably tropical, but each time the glacier crept south the plants retreated before it until what had been a tropical region was covered by many thousand feet of ice. Then as the ice retreated the plants followed it back north, going first up the valleys and then creeping slowly over the hills and up the mountains. But as the northward migration of plants started, some of the plants stayed behind in places where they seemed well adapted to live. This is the reason that we find so many pockets of typical mountain plants in our lowland bogs, where the climate is very different from that of their former home, but because of the nature of the soil and the contour of the land the general growing conditions are those of their former homes. Interesting evidences of a former tropical or sub-tropical climate in the northern United States are the fossil animals found there. In one particular place there is an outcrop of a coral reef. It is known that

corals will not live in water which goes below sixty degrees in temperature, so the obvious conclusion is that the reef was formed at least under sub-tropical conditions.

Comparatively little has been done along the line of paleobotanical research and it is very likely that a thorough working over of the material will clear up many matters of interest in establishing plant origins and plant relationships. It is a wide field of which only the borders have been touched, and it has a fascination to many people equal to the fascination of discovering and studying lost civilizations.

M. DORISSE HOWE

HOW OUR ANIMALS BECAME THEMSELVES

COWS furnish food for man and eat other harmful insects." This rather startling statement was once given by a city girl in answer to an examination question regarding the economic value of cattle. Amusing as it is, it reveals an ignorance of facts which should be matters of general information for everyone. Most striking is the lack of knowledge shown concerning the nature of man in relation to other animals. It is doubtful if the girl in question would have liked it had her comrades called her an insect, and equally uncertain that she had any clear idea of what constitutes an insect, let alone a human being.

A full and complete knowledge of man's position in the universe, even that infinitesimal part of it which we call the earth, is possibly the most useful factor in giving to us individually the broad, sympathetic tolerance and understanding needed to make of us teachers who are something more than mere imparters of information. The study of biology will go a long way toward giving us this knowledge, but even biology as we usually think of it, lacks perspective in that it deals with the world of living

things, plants and animals, now dwelling on the earth. No matter how much we may know of this phase of the subject, our knowledge is a good deal like the view one has of a forest when one is passing over in a plane. One sees the tops of the trees, and may get an oblique glimpse once in a while, but actually learns very little of what lies underneath, or of the forces which have made the trees what they are. To get a true perspective on biological interrelationships, one needs to know at least some of the big steps in the making of our modern world. Elsewhere in this number Miss Howe has told something of the plants which have preceded those which we know and which have largely determined what our plants of the present must be. In the present article I am attempting to sketch with a few bold strokes, the fascinating picture of the world of animals that lived in the ages of the world's youth, and to show how they solved problems, problems so important that had they not been successfully met, the modern world could never have come to be.

We do not know how living matter began. We possibly have a hint in those mysterious substances, the bacteriophages and the mosaic diseases of certain plants. These two, bacteriophage and mosaic, have many of the attributes of living substance, yet do not seem to be truly alive as we understand life. It is even barely possible that we have, here in these substances, matter which is in our own time undergoing that most important of all steps, the transition from the non-living to the living state. That some such process took place at some time very early in the earth's history we are reasonably certain. That it took thousands and hundreds of thousands of years, we may be sure. Creation is a mighty and a very gradual thing, a force which has been operative for ages and is still continuing.

Although we know nothing positive concerning the origin of living matter, we may

be sure that the earliest living beings were very simple, and doubtless minute, probably microscopic. The oldest rocks contain substances such as graphite, certain types of iron ore, and limestones which we know were produced by living beings and only by this means. Fossils, save those of bacteria, are wanting in these ancient rocks, simply because the living organisms which gave origin to these deposits were so simple that they left no hard parts which could be preserved as fossils. It is interesting to know that the impressions of the bacteria which formed certain of the oldest deposits of iron have been discovered in sections of the ore which have been ground to microscopic thinness. Even if the most primitive organisms were minute, that is no barrier to their having been present in such enormous numbers as to have formed thick layers of rock. The chalk cliffs of Dover and Calais have been formed by unicellular animals similar to species now living in the ocean. Their shells sink to the bottom after the animals perish, and gradually, in the course of thousands of years, lay down thick chalk deposits on the ocean floor. In course of time the sea bottom is elevated, becoming dry land, and we have beds of chalk or limestone. Such has been the course of events on the earth, and so it will continue until the end of time.

The element of time has been a puzzling one to paleobiologists, as those who study the course of ancient life on the earth are called. All sorts of speculations have been made as to how long it has taken our present world to emerge from the past. Various so-called measuring sticks have been devised, but none of them have been wholly satisfactory. The discovery of radium with all that it has done to profoundly alter our understanding of the nature of matter and of energy, has among other things, given us a measuring stick to use in determining the length of geologic time, more accurate than any hitherto devised. This is the so-

called lead-uranium ratio. It is known that a given amount of uranium eventually produces a given amount of uranium-lead in a given time. The amount of this lead present in rocks may, therefore, be used in determining the age of the rock. It takes one-half of any given piece of uranium about five billion years in round numbers to change into uranium-lead. Now five billion years, or longer, is just about the amount of time which biologists have believed must have been necessary for life to have progressed from its very simple beginning to its present complex state.

The first primitive animals were mainly, if not all, water-dwellers. For ages upon ages there was no animal life on the land except possibly a few soil amebae or other protozoa that had come to live in moist earth instead of in the water. There was very likely some verdure, for simple plants, such as algae, lichens, or simple bryophytes probably emerged to cover some of the earth's surface before it was occupied by animals to any extent. It must have been a strange and dreary landscape had there been eyes to see.

Animal life has always been more abundant along the shores of the ocean than in the great deeps. These littoral regions have always been very busy places, indeed, teeming with creatures great and small, all occupied in earning their livelihood. We think of clams, snails, shrimps, worms, crabs, and like creatures, but above all, fish as being abundant in such places. Picture an ocean without any fish! Yet the ocean for millions of years was fishless. Fish leave well-marked fossil remains, and such are completely lacking in the very early rocks. There were no back-boned animals. All animals, and there were thousands of different species, some of which have come down to us almost unchanged, were invertebrates. For ages it was so, and this time is known as the age of invertebrates.

One of the great mysteries of biology is

the origin of back-boned animals, the vertebrates. Whence came they? Thus far we have made little progress toward answering this question. True it is that there are simple animals having many of the characteristics of vertebrates, but lacking the back-bone. However, the gap is still very great between a sea-squirt, for instance, and a clam worm. It is still greater between the clam worm and the simplest true fish. Be that as it may, the first animal to discover the back-bone made the most epoch-making discovery of them all, for this creature established a body-type which had in it all the latent possibilities of humanity. From that point the progress was slow, but sure, and, as various difficult problems were surmounted, certain, toward the establishment of a type of being who should eventually develop our modern civilization. The only other animal kind to come into serious competition with the ultimate progress of the vertebrates has been the insects, and we have to admit that this competition has been, and now is very serious.

Once established in the seas and in the fresh waters of the globe, the fishes showed that they were creatures of great ability. All manner of forms and shapes of these creatures appeared, adapted to all sorts of environment that could be found in the water. They even dared to venture out of the water! The first vertebrates to try life on land were just "fish out of water." They managed to crawl more or less effectively on limb-like fins, and they had learned to use their swim-bladders to breathe with. They had to have moisture, and do not seem to have given up their gills, but they were learning. After a long time they found the solution of the question, how to get out of the water and stay out, at least most of the time. They had managed to reduce the number of fin rays in their fins, and also the amount of webbing between them until they had toes, more or less free

from web, just enough of that to swim with in some forms. For some reason they fixed upon the established number for toes as five, any departure from this number being in the nature of a variation from the primitive type. They had even dispensed with their gills for breathing in the water. However, they were not able to escape entirely from the water. They had to go into it to keep their skins moist, though some of the more advanced managed that by secretions from skin glands. More important still, it was absolutely necessary for them to lay their eggs in the water. This problem of the transition from water to land was solved by these simple amphibians, as you have guessed them to be, during the carboniferous time.

As that time drew to a close, as that vast duration of age upon age, so long that it was longer than all time subsequent to it, the Paleozoic, spent itself, there came a marked change in climate. The Carboniferous was, generally speaking, a time of relative humidity, of great swamps. Elevation of the land, possible shifts in the ocean currents, etc., changed everything and many of the amphibious vertebrates were faced with the choice of perishing or adapting themselves to the changed conditions. That they had real stamina is evidenced by the fact that they tackled this problem with all the patience that they had used in learning to live out of the water. There were two very troublesome aspects to their puzzle. They had a moist skin. A hot, dry climate would cause this to dry and shrivel. They got around this difficulty by covering themselves with scales. The next problem was that of their young. For ages they had been laying eggs richly supplied with food in form of yolk for their tiny children, but they had been laying these eggs in the water and their young had been spending their babyhood there. Now there was no water, or not enough to depend upon for this purpose. What could be done? They

proceeded to surround their eggs with a shell. Within the shell was included not only enough food-yolk, but sufficient water, and as the young developed within the egg shells they grew membranes of different sorts which enveloped the yolk to absorb it, covered their bodies to protect them, all surrounded and cushioned by water, and still another membrane to lie closely applied to the inner surface of the somewhat porous shell and absorb the life-giving oxygen. By the time these babies had used up all the food in the egg they were sufficiently developed to shift for themselves, and bursting the shell, hatched out to face their world. Such creatures were the first reptiles. So successful were they that they spread over all the world, invading its every life zone, even the air, for there were flying reptiles.

The next great discovery which vertebrates made was that of the four-chambered heart, and the warm-blooded type of circulation. Just when this came about we do not know, for the skeletons of some of these denizens of the age of reptiles were so much like those of warm-blooded animals that we can not be sure that they did not have the four-chambered heart. Contrary to opinion, hearts do not fossilize! The warm-blooded type of animal advanced in two great directions. One remained very reptile-like in all characteristics save the circulation, changed its scales to feathers, and founded the great bird family. The other, made up of small, very retiring and modest, but withal persistent animals, learned still another way of caring for its young by carrying them through their early stages of development within the body of the mother, nourishing them during infancy by a peculiar secretion, milk, from glands of the skin, and substituted hair for scales as covering for their bodies. These were the mammals, and they too were destined to become great upon the face of the earth, and their most successful member,

who rejoices in the sometimes unsuitable name, *Homo sapiens*, modern man, now rules them all.

Such, very briefly told, has been the story of the progress of animal life through geologic time down to the present, which is after all so like the past, that the general features of our landscapes have not changed for millions of years. What future progress shall be, we do not know, but we may feel sure that this marvelous progression will not stop. Problems will arise, but they will be solved, as they have been in the past until the end of the present phase of the solar system with its tiny earth shall have been reached. RUTH PHILLIPS

CREATING INTEREST IN BIOLOGY

BIOLOGY is the science of life—a study of living things—and only when it is presented as such will it become interesting and important in the sight of the child. And every successful teacher knows that his first problem is that of leading his pupil to become interested in the subject and to realize its worth. In order to do this the teacher must first convince himself of the fact that the subject is worth while, that it has direct values which can be linked up with the life of the child. Less than fifty years ago this would have been almost impossible because the acceptance of any biological subject as entrance credit to college dates back less than fifty years,¹ and the subject as first taught concerned itself with anatomy and classifications. Those taking the subject in its infancy concerned themselves chiefly with learning numerous structural and descriptive terms. Botany of the early period, especially, could almost be called a vocabulary subject. "When biology was introduced into the secondary schools, the sub-

¹Finley—*Biology in Secondary Schools and the Training of Biology Teachers*, 1926.

ject was taught by men and women trained almost wholly in college courses in morphology and classification; and in consequence a diluted type of college course was almost inevitable in the high school. Much of the laboratory material consisted of preserved specimens of plants and animals. Microscopical work of too difficult a type was insisted upon. Herbaria of dried specimens cluttered home and school. In recent years increasing emphasis has been placed upon the study of living organisms. Physiological experiments and ecological studies have been introduced. But still the type of topic selected for study is more or less that which appeals to the adult mind rather than to the mind of the adolescent. The material used was often remote from the everyday experience of the students, and biological studies still failed to function as largely as had been hoped. When teachers began to present biology in its relation to human welfare, a new and vital interest in the subject was awakened, and in many schools biology has become deservedly popular. It is evident that further progress in the pedagogy of the subject should be made along the line of organization of courses in biology which relate to various aspects of human welfare."² To reduce the whole thing and put it in a nutshell, biology failed some years ago to command the respect of pupils because it failed as material which would best equip the pupil to take his place as a prosperous, self-respecting citizen of the world. The aim in biology teaching in our secondary schools has changed from "biology for the sake of biology" to "biology in relation to human welfare."³ With this aim in view the teacher can easily convince himself and then his pupil of the fact that biology contributes to the educational objectives—health, worthy home member-

ship, the worthy use of leisure, ethical character, vocation, and citizenship.

Health has for a long time been a basic end of education and much of biology deals directly with problems of health. Biology touches the home life both within and without at many angles in that it creates a purposeful interest in the life of the environment by giving first-hand information about and acquaintance with plants and animals, and especially man as the center of attraction. A desire to spend leisure time in the enjoyment of nature's store of wonders is easily acquired through after-school trips to museums, industrial plants, field trips, and the like. The aesthetic appeal of plants and animals should enrich the life of the pupil to such an extent that he will naturally appreciate and enjoy nature. Ethical character is developed chiefly through biology in that it insists upon sound methods of thinking and clear reasoning out of problems. Truth is emphasized above all things, and only logical conclusions are accepted. The underlying knowledge of the science of biology if directed in the right manner can be a great aid to a pupil in choosing a vocation. The observant teacher will detect certain indication of pupils toward some vocation. Probably it will be that of medicine, bacteriology, museum work, nursing, farming, forestry, gardening, research, or what not. Can this grow out of a study of biology? A father of one of my pupils told me that his present position as a member of a research group for the Smithsonian Institution was an outgrowth of work done in a high school biology class. A good citizen appreciates an expert and the work he does for a community. Vocations of a scientific nature render invaluable service to society. The student of biology becomes more familiar with this work and its value to the community. The pupil should early realize the great aim of biology to be "a better understanding of man's place in nature" and

²Caldwell, O. W. and Committee—*Reorganization of Science in Secondary Schools*. U. S. Bureau of Education, 1920, Bulletin No. 26.

³Finley—*Biology in Secondary Schools and the Training of Biology Teachers*.

"the interdependence of plants and animals in relation to human welfare."

We have considered briefly the value and importance of biology. Now let us show some means by which it may be made practical and interesting to the pupil. Biology should deal primarily with living, growing things, because adolescent boys and girls are interested in activity and in things that concern themselves. Therefore, functions rather than structures of living things should be emphasized. In the beginning, at least, the materials should be the living things of the pupils' environment. Pupils come for the first time into a biology class with many and varied ideas as to what it is all about, and most of them are eager to find out. Invariably he wants to study "bugs" or "frogs." He has stood on the outside of your laboratory door many a time before he was far enough advanced to take the course, and watched you dissect a frog. Now he rejoices that he can "come in." Dare we kill the interest of such a pupil by stressing memory of long dictated paragraphs or repetitions of General Science when there is so much of life and interest already in the biological course? Why do we not begin with the topic of vital interest to the pupil and work in skillfully those details which are essential? Many readers will contend that this is very easy to say but not so easy to do. I agree with you that this is true if you are confining yourself to the textbook and the old question-answer method of teaching, exclusively. But if you are willing to undertake a project in the Group-Study Plan or the Contract Plan you will find it quite different. I wish to outline below a unit of work which was done by a 9B Biology Class under my direction in the Washington Lee High School in Arlington County. I shall not only give the unit, but include the results also.

BIRDS IN RELATION TO HUMAN WELFARE

Time: One week.

Text: Peabody and Hunt—*Biology and Human Welfare.*"

D—Assignment

1. Read carefully Chapter XX, "How Birds Are Related to Human Welfare." (text)
2. Make a list of ten outstanding questions that you intend to answer during this study. Read these questions to the class and receive a criticism of them.
3. Sketch the bird found on page 420, Fig. 268, of the text. Label and learn each region indicated there.
4. Write out brief answers to these questions:
 - a. How does a bird fly?
 - b. How are the legs and feet fitted for their function?
 - c. Explain how birds reproduce.
 - d. Of what does a hen's egg consist?
 - e. How is a hen's egg formed?
 - f. Why does a hen's egg develop into a chick?

(One pupil from the group will be asked to lead a discussion involving these questions. The one who finishes first will be designated to do this.)
5. The instructor will use ten minutes of each class period to lecture and discuss with the entire class the following topics. Pupils will take notes:
 - a. Vital functions and organs of a bird.
 - (1) Circulation—Monday
 - (2) Respiration—Tuesday
 - (3) Digestion and Excretion—Wednesday
 - (4) *Reproduction—Thursday
 - (5) Sensation—Friday

*Experiment (demonstration)
Dissection of a hen's egg and study of parts. (Each pupil will write up the experiment.)
6. Make a list of all the books and maga-

zines (with authors and publishers) that you use in this work.

C—Assignment

1. Write a composition on one of the following topics and read it to the class as soon as it is finished:
 - a. The Value of Birds to Man
 - b. The Dangers That Threaten Birds
 - c. Some Ways in Which Birds May Be Injurious to Man
2. Make a study of the living bird in its natural abode and write up the experiment answering these questions:
 - a. What is the name of the bird?
 - b. How many toes has it? Are these toes grouped two in front and two behind, or three in front and one behind? Are the toe nails long or short? Why? Are they used for taking food? For holding food? For perching? For scratching? For wading? or for what?
 - c. How are the feathers distributed? Where are the long feathers? the short feathers? Are they evenly colored? Does the bird have any special markings?
 - d. Does the bird walk or hop?
 - e. Examine the beak. Is it adapted for crushing seed? tearing flesh? catching insects? drilling? or what?
 - f. Examine the eyes. Does the bird wink? Does it have eyelashes?
 - g. Describe the sound made by the bird.
 - h. How does the bird eat? bathe? "dust"?
 - i. State any additional observation that you make regarding the bird.
3. Make a list of five distinctively useful birds and five harmful birds, giving one outstanding characteristic of each.
4. Explain how protection of the law has been extended to birds and also tell what the United States and Great Britain together have done to protect

migratory birds. Is this a good thing? Why? (Written paragraph.)

B—Assignment (answer any four)

1. Give an oral report on the topic: "My Favorite Bird." Include in your report—
 - a. The outstanding characteristics.
 - b. Its habits of life (nest-building, food-getting, care of young, etc.)
 - c. Use or harm to man.
 - d. Habitat (where it lives).
2. Write a composition on the life and works of one of the following men:
 - a. John James Audubon
 - b. John Burroughs (be prepared to read this to the class).
3. Keep a bird chart for one week:
 - a. Name of bird.
 - b. Where seen.
 - c. When seen.
 - d. What doing.
 - e. Description.
4. Make a list of the ways in which an individual can protect birds and encourage them to breed.
5. Make a poster bird chart or a bird calendar, give the name of each bird, and its native home if possible.

A—Assignment (answer any two)

1. Make a list of fifty common birds and give a characteristic of each.
2. Visit the birds at the Zoölogical Gardens in Washington, and make a list of as many birds that you see there as you can, giving one characteristic of each. (Our school is two miles from Washington, D. C.) Report to the class on this trip.
3. Visit the National Museum and study the birds found there. Write an account of your visit and report your finding to the class.
4. Write a composition of at least 500 words on the subject: "The Work of the Government in Protecting Birds." (1) National, (2) State, (3) Private.

Include in this as many of the bird laws as you can.

5. Make two of the following and tell the class how you did it:
 - a. Bird box.
 - b. Bird bath.
 - c. Feeding station.

References:

1. Peabody and Hunt—*Biology and Human Welfare*.
2. Smith—*Everyday Science Projects*.
3. Smallwood, Reveley, and Bailey—*New Biology*.
4. Davenport—*Elements of Zoölogy*.
5. Clement—*Living Things*.
6. Blanchian—*Birds*.
7. Moon—*Biology for Beginners*.
8. *Useful Birds of America*, Series A, one, two, three, four—30 in a set. Sent on request by Church and Dwight Co., Inc., 27 Cedar St., New York, N. Y. (10 cents to cover mailing.)
9. Audubon bird leaflets 5½ by 8½ with four pages of descriptive material. 5 cents each (five cards). National Association of Audubon Societies, 1974 Broadway, New York City.
10. Booklet of sixteen common birds (sent upon request). Dwinell-Wright Co., 311 Summer St., Boston, Mass.
11. Reed—*Bird Guide*.

This assignment was given to an average class of thirty pupils. My first step, after providing each pupil with a copy, was to explain every part of it in detail and to give instructions as to the procedure. This was done on Friday before the Monday on which the work was to be started. Each copy was then collected and held by me until the day of beginning. The pupils were asked to use the week-end for obtaining books and material for work. Books and pamphlets were to be brought in and left on a shelf designated for this purpose. The class as a whole appeared very much interested. On Monday—the day of beginning—quite a good supply of books and some bird charts were brought in. I had outline charts and pictures on the walls of the room also. The room had begun to take on the appearance of a work shop. The papers were given out and work started (of course, certain directions as to mechanical details

were given). Results at the end of the week were as follows:

- 3 pupils completed the A-Assignment
- 6 pupils completed the B-Assignment
- 14 pupils completed the C-Assignment
- 7 pupils completed the D-Assignment
- 0 pupils below the D-Assignment
- 1 pupil started the A-Assignment, but did not finish it.
- 4 pupils started the B-Assignment, but did not finish it.
- 5 pupils started the C-Assignment, but did not finish it.
- 5 pupils visited the zoo in the interest of this work.
- 6 pupils visited the museum.

A large percentage of the class sent for one or more of the pamphlets on birds.

All pupils liked the work and several asked for another unit.

This unit of work was chiefly centered around the plan outlined by Miller and Hargreaves in *The Self-Directed School*. At present I am working on a unit based on "The Group-Study Plan" by Edward R. Maguire.

SADIE S. WILLIAMS.

BIRD STUDY

TO THE close observer, it is evident that in recent years there has been a great increase of interest by people of all ages and all walks of life in the identification and life habits of birds. This is shown by the increased number of adults who have taken up bird study as a hobby and by the large amount of legislation designed to protect birds. Children, too, are changing their attitude from the destructive to the constructive. We do not have to search far nor long to find the reasons for this interest.

Perhaps the basic reason is an economic one. Agriculture has become intensified and new forms of plants have been introduced into our country. With them have come new weeds and insects which, added to those we already had, have complicated

the business of farm production, and, while artificial control has its undoubted value, natural control is the mainstay that has been in operation for all the ages. Birds are, and have ever been, the chief foe of both weeds and insects. A case in point might be cited. An aphid will produce thirteen generations in a single season of at least one hundred young to each generation. It follows, then, that at the end of a single season an aphid could have ten sextillions of progeny in the last generation. If these were put into a single line of ten aphids to the inch, it would take a ray of light traveling at the rate of 186,000 miles a second two thousand and five hundred years to pass from one end of that line to the other. Now if we will pause for the space of time that it takes that ray of light to go one of those 186,000 miles, we will realize that a pair of aphids never have that many descendants in a season. One of the reasons is the appetite of the yellowthroat warble which is known to have eaten 89 aphids in one minute, which is rather discouraging to the multiplying powers of the aphid. In Virginia the bob white alone, destroys, at a conservative estimate, 600 tons of weed seed. Further examples would be in the nature of an anticlimax, and the total economic benefits of birds would be difficult to estimate—and to believe. It is safe to say, however, that birds are the principal item in farm relief.

It is not for their services alone that we care for birds; we love them for themselves. From the time the first robins make us think of separating our spring suits from the moth balls until we hear the southward migrating geese, they are a part of our daily lives. We listen to their songs, and watch them build their nests and feed their young. Even the back seat driver varies the monotony of life by saying "Now, what was that bird?" They are interesting folk. If you note the sad expression on the face of a nestling robin, you may well assume that

it has not had its daily dozen—feet of earthworms. Nests alone are of infinite variety. The tern lays its eggs among the pebbles on the beach, while the Baltimore oriole constructs an intricate affair that it suspends from the twigs of a tree, and is a master weaver. The barn swallow is a mason and builds its home of mud, using its beak for a hod and its breast for a trowel. The cow bird evades maternal responsibility by laying her eggs in the nests of other birds. Incidentally, the cow bird is not the black sheep of the family; it is a black bird. Then there are birds that sing and birds that think they can sing—the thrush and the crow. How like people they are. Feet, bird feet, any kind of feet, are fascinating. Delicate little claws and sinewed talons, scratching feet and great spreading paddles, all tell where they lead their owners. Did you ever see a woodpecker holding on by two toes and rearing back on the other two? Then there are beaks—but space does not allow the taking up of the personality of noses.

The point is that bird study is a human sort of thing and, as such, offers to teachers an excellent opportunity to preface and introduce social studies in the schools. The social life of birds leads logically to the study of the social life of man. Study of the family life of the birds leads easily and naturally to the study of the family life of man and its responsibilities.

Likewise, man's inhumanity to man has much of its origin in man's inhumanity to animal life. Much of human nature is achieved; not all of it is hereditary. The boy that has a warped delight in crippling a bird can easily become the man who can easily take human life, while the boy that loves birds and flowers is more likely to become the one who loves his fellow man. The child may not have the proper human environment to properly develop his moral nature. We may not be able to change that, but we can substitute for the land of the

birds and flowers and dreams and visions. Some one has said that the success and greatness of the English race is due to the fact that every Englishman, no matter how poor, will have a dog. It is something on which to lavish his affection and produces self control, pride of ownership, gentleness, and strength of will. What is true of the dog is true of the horse. It is not so much the question of the kind of animal, but rather that mankind needs association with some kind of animal to make him a better man. Birds too have their humanizing influence.

While the development of morality and a good social adjustment is one of the principal aims of education, acuteness, and accuracy of observation are also very important. Can there be anything better than birds, with their variety of colorings and

markings, their songs, nests, habits, and migrations, lend itself to this end? Try to formulate a description of the wood thrush and the brown thrasher that will actually enable one to distinguish between them, and you will realize your own inability in this respect. In a course in bird study last summer, the students said they had not realized how little they had been seeing before they had started to study birds. When asked at the beginning of the course how many different birds they would expect to see during the next few weeks, the average answer was from twenty to thirty. As a matter of fact they identified during the five weeks no less than ninety different birds. No doubt, several times that many would have been seen if the observations had run throughout the year. These birds are given in the list below:

BIRDS SEEN AT HARRISONBURG FROM JULY 27 TO AUGUST 30

Downy Woodpecker	English Sparrow	Robin
Crow blackbird	Partridge	Ruby-throated humming bird
Killdeer	Yellow warbler	House wren
Wilson warbler	Crow	Yellow-bellied sapsucker
Wilson's thrush	Mocking bird	Black and white warbler
Night hawk	Catbird	Red headed woodpecker
Wood thrush	Mourning dove	Chimney swift
Rusty blackbird	Wood pewee	Barn swallow
Meadow lark	American goldfinch	Chipping sparrow
Yellow-billed cuckoo	Baltimore oriole	Black-capped chickadee
Cardinal	Brewer's blackbird	Brown thrasher
Starling	Black-bill cuckoo	Flicker
Brown creeper	Turkey buzzard	Red-winged blackbird
Screech owl	Pigeon	Field sparrow
Song sparrow	Towhee	Bobolink
Phoebe	Purple martin	Rose-breasted grosbeak
Brewer's sparrow	Vesper sparrow	Cowbird
Bluebird	Scarlet tanager	Yellow-throated vireo
Cooper's hawk	Indigo bunting	Kingbird
Purple grackle	Black tern	Franklin's gull
Ruby-crowned kinglet	Fish hawk	White-breasted nuthatch
Upland plover	Blue heron	White heron
Green Heron	Tufted titmouse	Belted kingfisher
White throated sparrow	Cliff swallow	Swamp sparrow
Blue jay	Spotted sandpiper	Slate colored junco
Tennessee warbler	Orchard oriole	Sparrow hawk
Maryland yellow-throat	Winter wren	Hairy woodpecker
Pine tree warbler	Greater scaup	Loggerhead shrike
Least flycatcher	Warbling vireo	Whip-poor-will
Barn swallow	White swan	Golden-crowned kinglet
American three-toed woodpecker		

Could anyone learn to distinguish all these birds without acquiring accuracy of observation?

Perhaps, after all, the best thing about

bird study is that all children, young and old, like it. It is not like getting vitamins where one has to eat spinach. Anyway, I have never seen a bird eat spinach.

G. W. CHAPPELEAR

DETERMINATION OF OBJECTIVES IN BIOLOGY TEACHING, PAST AND PRESENT*

THIS paper is a report of an investigation made to determine the relative agreement or disagreement among textbook writers and others as to the objectives in biology teaching in high schools, and to determine those which tend to be most desired at this time. For this work the prefaces, introductions and first chap-

ters of forty texts were used, also treatises on secondary education which discuss objects of biology teaching and committee reports. The texts used included twenty biology, ten botany, and ten zoölogy, publishing dates ranging from 1896 to 1920, inclusive. There is also a brief comparison made between objectives previous to 1900 and those held since 1900. The following is a list of the books used, arranged in order of publication.

BIOLOGY TEXTBOOKS

<i>Author</i>	<i>Text</i>	<i>Publishers</i>	<i>Date of Publication</i>
Hunter	Elements of Biology.....	American Book Co.	1907
Conn	Biology	Silver, Burdett Co.	1918
Peabody and Hunt.....	Elementary Biology	Macmillan	1913
Hunter	A Civic Biology.....	American Book Co.	1914
Hodge and Dawson.....	Civic Biology	Ginn	1918
Gruenberg	Elementary Biology	Ginn	1919
Smallwood, Reveley, and Bailey	Biology for High School.....	Allyn and Bacon.....	1920
Moon	Biology for Beginners.....	Henry Holt	1921
Atwood	Civic and Economic Biology.....	Blakiston's Sons	1922
Hunter	New Essentials of Biology.....	American Book Co.	1923
Trafton	Biology of Home and Community.....	Macmillan	1923
Clement	Living Things—An Elementary Biology	Iroquois Publ. Co.	1924
Peabody and Hunt.....	Biology and Human Welfare.....	Macmillan	1924
Gruenberg	Biology and Human Life.....	Ginn	1925
Hunter	New Civic Biology.....	American Book Co.	1926
Kinsey	An Introduction to Biology.....	Lippincott	1926
Moon	Biology for Beginners.....	Henry Holt	1926
Atwood	Biology	Blakiston's Sons	1927
Menge	The Laws of Living Things.....	Bruce Publishing Co.	1927
Weldon	Economic Biology	McGraw Hill	1929

BOTANY TEXTS

<i>Author</i>	<i>Text</i>	<i>Publishers</i>	<i>Date of Publication</i>
Bergen	Elements of Botany.....	Ginn	1896
Barnes	Plant Life	Henry Holt	1898
Bergen	Foundation of Botany.....	Ginn	1900
Coulter	Plant Studies	Appleton	1902
Bergen and Caldwell.....	Practical Botany	Ginn	1911
Bailey	Botany for Secondary Schools.....	Macmillan	1913
Sergent	Plants and Their Uses.....	Holt	1913
Bergen and Caldwell.....	Introduction to Botany.....	Ginn	1914
Atkinson	Botany for High Schools, 2nd Edition (1912 revised).....	Holt	1925
Pool and Evans.....	First Course in Botany.....	Ginn	1928

ZOOLOGY TEXTS

<i>Author</i>	<i>Text</i>	<i>Publishers</i>	<i>Date of Publication</i>
Jordan and Heath.....	Animal Forms	Appleton	1902
Jordan and Kellog.....	Animal Life	Appleton	1903
Jordan, Kellog, and Heath.....	Animal Studies	Appleton	1903
Davison	Practical Zoölogy	American Book Co.	1906
Linville and Kelly.....	Zoölogy	Ginn	1906
Galloway	Elementary Zoölogy	Blakiston's Sons	1910
Daugherty	Principles of Economic Zoölogy.....	Saunders	1912
Hegner	Practical Zoölogy	Macmillan	1915

*This paper is the outcome of a problem studied in 1923 at Teachers College, Columbia University, under the supervision of Dr. S. R. Powers.

Kellogg and Doane.....	Economic Zoölogy and Entomology	Holt	1915
Linville, Kelly, and Van Cleave	General Zoölogy	Ginn	1929

The other publications used and dates of publication are as follows:

<i>Author</i>	<i>Text</i>	<i>Publishers</i>	<i>Date of Publication</i>
Snedden	Problems of Secondary Education	Houghton Mifflin Co.	1917
Inglis	Principles of Secondary Education	Houghton Mifflin Co.	1918
Bureau of Education.....	Cardinal Principles	Bureau of Education	1918
Bureau of Education.....	Reorganization of Science.....	Bureau of Education	1921
Stout	The Development of High School Curricula in the North Central States from 1860-1918.....	University of Chicago	1921
Finley	Biology in Secondary Schools and the Training of High school Teachers	Bureau of Publications, Teachers College	1926

The prefaces, introductions and first chapters of the texts were read and the authors noted on cards (3 in. x 3 in.), each card bearing the objectives stated by the author or authors in one book only. When

this was completed the various objectives of all authors were classified, and the frequency of recurrence noted as shown in the accompanying table.

TABLE SHOWING FREQUENCY OF RECURRENCE OF OBJECTIVES IN VARIOUS TEXTBOOKS

<i>Objectives</i>	<i>Biology 20</i>	<i>Botany 10</i>	<i>Zoölogy 10</i>	<i>Total 40</i>
Interpretation of Biological, Botanical and Zoölogical Phenomena	18	8	7	33
Ecological	16	7	7	30
Economic	12	5	5	22
Disciplinary	10	6	6	22
Morphological	4	8	6	18
Physiological	10	6	2	18
Health	13	1	3	17
Coöperation for common good (Adjustment to life relations).....	11	2	2	15
Sociologic	13	..	..	13
Classification	3	4	5	12
Enjoyment—Interest for leisure time.....	5	4	2	11
Domestication and improvement of plants and animals	7	2	..	9
To correlate study of botany, zoölogy and human physiology and relation to other subjects.....	8	..	1	9
Preparatory	6	1	2	9
Laboratory and Field Work.....	Not determined	3	5	8
Conservation	6	..	..	6
Informational .....	..	4	1	5
Habits and Life History of Animals.....	..	..	4	4
Vocational	3	..	..	3
To exhibit variety and progressive complexity.....	..	3	..	3
To understand struggle for existence.....	..	3	..	3
To present elementary phenomena (physics and chemistry) needed for physiological work in biology..	1	..	..	1
To make pupils acquainted with important works on zoölogy .....	..	..	1	1
Psychological .....	..	..	1	1

By studying the table we find that eighteen of the twenty biology texts include, as an objective, ability to interpret biological phenomena. Eight of the ten botany and seven of the ten zoölogy texts also include this objective. This makes a total of thirty-three of the forty texts used. The ecological aspect (study of plants and animals, including man, as related to their environment) is mentioned in sixteen biology, seven botany and seven zoölogy texts—a total of thirty books. The economic phase is stated as an objective by twenty-three authors, twelve in biology, five in botany and six in zoölogy. The disciplinary aspect is mentioned by twenty-two authors, and the morphological and physiological by eighteen. The health aspect is mentioned by seventeen authors. The others as shown are mentioned by less than seventeen of the authors. From the foregoing we learn that the only objectives at all commonly stated by these authors of textbooks in their prefaces, introductions and first chapters are (1) ability to interpret biological phenomena and (2) knowledge of plants and animals as related to their environment. The other five objectives given above are mentioned by approximately half of the authors. We note, therefore, comparatively little agreement among authors in this study of objectives.

In order to determine the tendency in aims in biological teaching, we shall first consider those objectives or points of view determined by Stout and others for the period previous to 1900, then those for the period 1900 and after. Stout found that there were three aims clearly shown; first, the religious aim, still in evidence in 1860. Though not very important, references were made to this in prefaces of texts up to the close of the century. The second aim is that for knowledge. This includes two points of view. One "emphasized the value of knowledge—truth for truth's sake—to the end that the learner may be regarded

as an intelligent person." The other "emphasized the importance of science from the standpoint of practical utility as distinguished from a knowledge which merely contributed to one's general intelligence." The third and controlling aim, especially during the latter part of the period, was that of mental discipline. He divided the study of botany and zoölogy into four periods. For botany there are (1) previous to 1860 emphasis placed on premedical training and religious aim—the latter as has been mentioned persisting somewhat throughout the century; (2) emphasis almost entirely upon anatomical structure with the aim to train students in the technique of analyzing and classifying flowers and plants; (3) emphasis placed upon morphology of plants with the aim to train "into scientific habit of mind" (mental discipline); (4) emphasis placed on practical value. This is shown in Bergen and Caldwell's book. The change became noticeable among authors of textbooks only after 1910. In Finley's monograph we find practically the same aims mentioned for the study of botany as in Stout's publication. With reference to the last period, it is interesting to note that Dr. Finley says, "Teaching botanists of the day began to question the disciplinary value of the systematic morphological botany. Plant ecology, plant physiology and economic relations were stressed in science associations and in the written articles of the period." To illustrate the change of thought, he quotes from an article in *School Science and Mathematics*, May, 1901, by A. M. Ferguson, as follows:

"Botany does not mean the 'analysis and naming of flowers' nor pressing specimens and calling it an 'herbarium.' Botany concerns plants, how they grow and are grown, when and where they came from, their habits and peculiarities, and the relation they bear to the general economy of nature."

Dr. Finley then makes the following com-

ment. "The kind of botanical instruction advocated in these quotations is that which is receiving emphasis at the present time." Furthermore, we note in our study that the economic aspect is decidedly stressed by the more recent botany authors.

For zoölogy the four periods are as follows: (1) characterized by the formal aspect of the subject. Though this period emphasized classification, it included natural history. The zoölogists of the period "were interested more in certain traits which animals and men possess in common than in anatomy and morphology" (Finley). Dr. Finley again quotes (This is from Tenney, Sandborn and Tenney, *Natural History of Animals*, 1871):

"'Animals are most interesting objects of study, and the child as well as the man is delighted with learning their forms, structure, color, habits, and names and soon becomes as eager as a naturalist to find a new Bird or a new Butterfly.'" During this early period the religious aim was also stressed. The following from Agassiz and Gould, *Principles of Zoölogy*, 1848, expresses it.

"'Should our aim be attained, this work will produce more enlarged ideas of man's relations to Nature, and more exalted conceptions of the Plan of Creation and its great Creator.'" (Finley.)

(2) characterized by comparative anatomy—anatomical structures and classification of animals receiving most attention and the religious aim still in evidence.

(3) anatomical structure still remained the basis of work, but the morphological point of view was emphasized—much stress placed upon lower forms of life and laboratory work introduced (no "innocent and virtuous amusement" offered by these books nor opportunity to "occupy agreeably the leisure or vacant hours of life").

(4) marked by the attempt to combine the earlier natural history type of material with the more formal anatomical and mor-

phological type. Field work was combined with laboratory work and emphasis was placed upon the functional aspect of animal life.

Inglis gives three periods in the development of study of the natural sciences in secondary schools.

(1) 1800-1870—sciences studied largely as informational courses.

(2) 1870-1900—marked by tendency to organize the study of natural sciences according to the demands of pure science.

(3) 1900—characterized by attempts to organize the study of natural science in part according to their applications.

Thus we see that changes in subject matter previous to 1900 were due to professional influence—the shift of influence and point of view of teachers of science. Though the aim of high school was to prepare for life as well as for college, and the former purpose was mentioned in many prefaces previous to 1900, the texts gave little material which could claim to do this. Subject matter was treated in an extremely formal style, which resulted in great dissatisfaction with science teaching. After 1900 (more marked after 1910) we find that aims of authors are influenced by the practical value of their subject.

Let us compare the foregoing with the textbooks studied. We note the following facts. Thirty of these books were published in 1910 or later. Twenty-two, or slightly more than half of all considered, mention the economic aim. These include only two books published previous to 1910. The disciplinary aim, mentioned in twenty-two, the physiological in eighteen, classification in twelve, and laboratory and field work in eight are well distributed over the whole period studied (1896-1929). Eighteen, or approximately half of the books considered, mention as an aim the study of morphology. Among these, however, only four were published after 1915. The health aim mentioned in seventeen, correlation of botany,

zoölogy and human physiology in nine and preparatory in nine are each noted in only one book published previous to 1910. Adjustment to life relations (coöperation for common good) noted in fifteen, the sociological in thirteen, enjoyment (worthy use of leisure) in eleven, domestication and improvement of plants and animals in nine, and conservation in six were not mentioned before 1910. The vocational aim is included on three (1919, 1921, 1929). Here we also find the tendency toward aims which are practical and aims which are influenced by the industrial world. And in the objectives noted in *Cardinal Principles of Secondary Education* and in *Reorganization of Science in Secondary Schools* we find a similar course.

Cardinal Principles include these seven aims—(1) Health, (2) Command of fundamental processes, (3) Value of home membership, (4) Vocation, (5) Good citizenship, (6) Worthy use of leisure, (7) Ethical character.

Snedden gives the following as his objectives, the first two being of greatest importance.

(1) to give boys and girls an outlook upon the world, as interpreted through biological sciences, which as a part of general culture will be demonstrably worthwhile.

(2) to give to all persons, who must stand in the utilizing or consuming relationship to life, a varied and full appreciation of the applications of biological knowledge to the enormous range of productive activities as to the products of which each one of us stands in an important relation as consumer (to train pupils to be consumers in the scientific sense—make demands for pure food, remedial measures in medicines, etc.).

(3) have biological science contribute to an enlargement of the pupil's comprehension of modern life by an intellectual consideration, through all forms of popular literature, of modern development in agri-

culture, medicine, forestry, fisheries, etc., based upon this knowledge.

(4) to give the pupil an appreciation of the meaning of scientific method as applied in the world of pure science as well as practical affairs, and more particularly as such method applies in biological science, where such instruments of precision as the microscope, means for breeding of bacteria, etc., can be considered.

(5) to apply biological science to such fields of human activity as the breeding of useful animals, the elimination or reduction of animal life injurious to human beings, and in conservation of human health.

(6) to have a useful and valuable appreciative attitude towards the work of specialists, and to be able to put a premium upon that work which is done by persons most completely equipped for their work.

(7) to study biology for cultural or general purposes.

(1) may be said to include or correspond to interpretation of biological phenomena in our table. (2) may be said to include our health aim, adjustment to life relations, conservation, domestication and improvement of plants and animals. (3) may include interpretation of biological phenomena. One author only, however, speaks of making pupils acquainted with the important works of zoölogical information (1906). (4) may include the disciplinary, laboratory and field work and preparatory aspects. (5) also includes several of our aims, while (6) is not mentioned by any author. (7) may be included in the informational objective.

Bobbitt's objectives are summarized in the following outline:

1. Ability to perform the several processes involved in the effective development and maintenance of one's physical efficiency.

2. The unspecialized abilities involved in the care of plants about one's premises.

3. The unspecialized abilities involved in the care of poultry, bees, live-stock, pets,

etc. (Of less general serviceability and therefore appropriate to only a portion of the pupils.)

4. Ability, disposition and habit of observation of significant biological phenomena as an enjoyable and fruitful leisure occupation.

5. Ability, disposition and habit of reading relative to biological matters as an enjoyable and fruitful indirect method of viewing biological phenomena; also a leisure occupation.

6. A proportioned vision (according to one's intellectual capacity) of the biological world as a whole—plant and animal series—as it exists today and in its genesis.

7. Ability wisely to control the several biological factors—so far as control is possible or desirable—involved in the responsibilities of parenthood.

8. Ability, disposition, and habit of viewing Man in world-genesis and relation—as a major foundation of one's sense of human brotherhood, and as one of the most inspiring visions of one's religion.

Bobbitt does not include in his objectives the aim to teach children the importance of conservation and domestication and improvement of domesticated animals and plants, except if we consider his second and third aims in a very broad sense. He does not include the vocational nor the preparatory, but does make mention of the religious aim.

By a study of our table on textbooks as given above we find that though there is comparatively little agreement among textbook authors as shown by their prefaces, yet there is the tendency toward emphasis by the more recent writers (1910 and after) on the following objectives:—Understanding of economic relations between plants and animals and man, health, adjustment to life relations, conservation, domestication and improvement of plants and animals, sociological, worthy use of leisure, and vocational. Checking this list with those aims

given in *Cardinal Principles* we find the following common to both:—Health, worthy use of leisure, worthy home membership, good citizenship, and vocational. (Very recent.) Bobbitt, Inglis and Snedden do not include the vocational. On the whole, however, we find that the aim is to make material practical, of use to the individual to make him a better citizen.

"The purpose of democracy is so to organize society that each member may develop his personality, primarily through activities designed for the well-being of his fellow members and of society as a whole."

BERTHA WITTLINGER

PRESENT CLIMATE NOT CHANGING

IF THE word "climate" is first defined, the likelihood of any misunderstanding from the title is somewhat reduced. In Maury-Simonds' *Physical Geography* (1908), page 210, statements are found which say that climate includes "an aggregate of weather conditions" based upon observations extending over a series of years. The discussion of the statement indicates that the longer the period of observation, the more valuable become the data upon which climate is established. More recent publications give the same idea in defining and discussing climate.

As it is so often remarked in conversations that climate is changing, it is well to notice this popular idea in its conflict with the observations of those who make a scientific study of climate. The popular idea of climate changing is based upon memory and the "feelings" type of observations. Memory is inclined to recall the exceptional years or climatic conditions which were outstanding because they were unusual. In contrast, the climatologist bases his decision on the records which have been preserved from daily observation of standardized instruments.

The climatologist carefully distinguishes

between sensible temperature and the temperature recorded by the thermometer. At times, one hears a remark about the air feeling so much warmer because it contains moisture. A few months later, in the winter season, a similar remark may be heard only then it is colder because there is so much moisture in the air. Those remarks have to do with the sensible temperature, and it is that kind of temperature which contributes to the popular memory. It is accepted that moisture in the air does affect how warm or how cool, a person may feel in the different seasons. As the climatic records of temperature give the results of readings from thermometers, sensible temperature is not included in this study.

The rainfall records are secured by using a rain gauge which has been properly placed. Then it is carefully observed. This recording of the rain is in contrast with the memory of the length of time the roads were muddy, how long the fields were wet, or the days during which water stood in specified depressions. The rain gauge gives a standard measurement for all conditions and seasons, and when systematically observed, it gives records which are not influenced by any person's memory or opinion.

The Dale Enterprise weather station is four miles west of Harrisonburg, and a study of records from that station can well be used to illustrate what may be learned regarding the climatic conditions of any locality having provision for systematically recording temperature and rainfall. The temperature records of that station commence in 1891 and continue to 1928. As a test study of whether spring begins earlier or later than it did nearly forty years ago, the date of the last killing frost in the spring has been plotted as shown in Fig. 1. It is observed that the earliest date of the last killing frost in the spring was April 9th; this occurred in 1894. The latest date on which a killing frost was experienced was May 28, 1907. Figure 1 illustrates how

the frost date has fluctuated, so the average date of the last killing frost in the spring becomes April 27th. This date is indicated by the heavier dashed line in the figure.

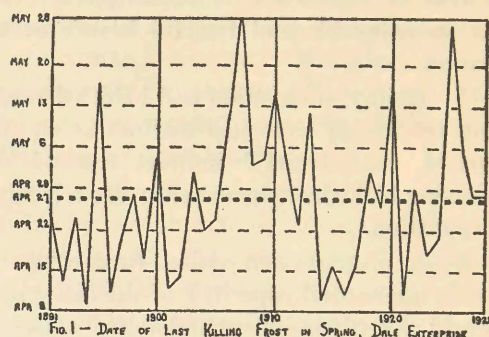


FIG. 1 — DATE OF LAST KILLING FROST IN SPRING, DALE ENTERPRISE

In a similar manner, the dates of the first killing frost in autumn for the Dale Enterprise station are shown in Fig. 2. The year 1900 had the most postponed autumn frost, as in that year it was recorded November 9th, while 1916 furnished the earliest killing frost which was experienced Sep-

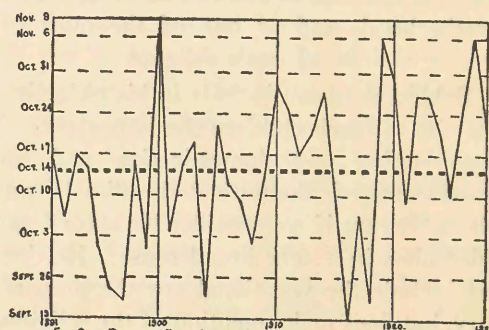


FIG. 2 — DATE OF FIRST KILLING FROST IN AUTUMN, DALE ENTERPRISE

tember 19th. From the thirty-eight years of record, the average date of the first killing frost in the autumn becomes October 14th. The heavier dashed line in Fig. 2 indicates this date. From these two illustrations, it is evident that there may be a period of a few years during which the killing frost may be noticeably earlier or later than the average date, yet when the record of all the years is viewed, there is not a change of climate in respect to the frost dates.

Linked with the last killing frost in the

spring and the first killing frost in the fall is the length of the growing season. These are not represented by a figure in this article. The average length of growing season is found to be 171 days. The greatest number of days any year has had a frost-free period was 201; this occurred in 1914. In 1907, the growing season was limited to 134 days, which is the minimum recorded by the Dale Enterprise station.

The rainfall records for the selected station are published for 49 years. This length of record furnishes a good opportunity to study a series of years and approaches the standard mentioned in the first paragraph concerning the greater value of a longer series. These records are represented in Fig. 3. The year having the greatest recorded rainfall was 1886 when the total received measured 68.31 inches. Only five other years have a record of a precipitation

of more than 50 inches. In 1882, 56.01 inches were received and in 1901, 56.28 inches were recorded. During the forty-nine years, there have been only four in which less than 30 inches of rainfall were received. The minimum was in 1921 with 28.72 inches. The other three with low records were 1894 with 29.22 inches; 1895 with 29.50 inches; and 1925 with 29.56 inches. The average annual rainfall measures 40.55 inches. This is indicated by the heavier dashed line in Fig. 3. The representation of the rainfall records shows that the precipitation has varied above and below the average and that this has been experienced during the years for which the records are available.

Not only may one study the annual rainfall, but also the rainfall received in some month of the year. Any month might have been used. However, the choice of August

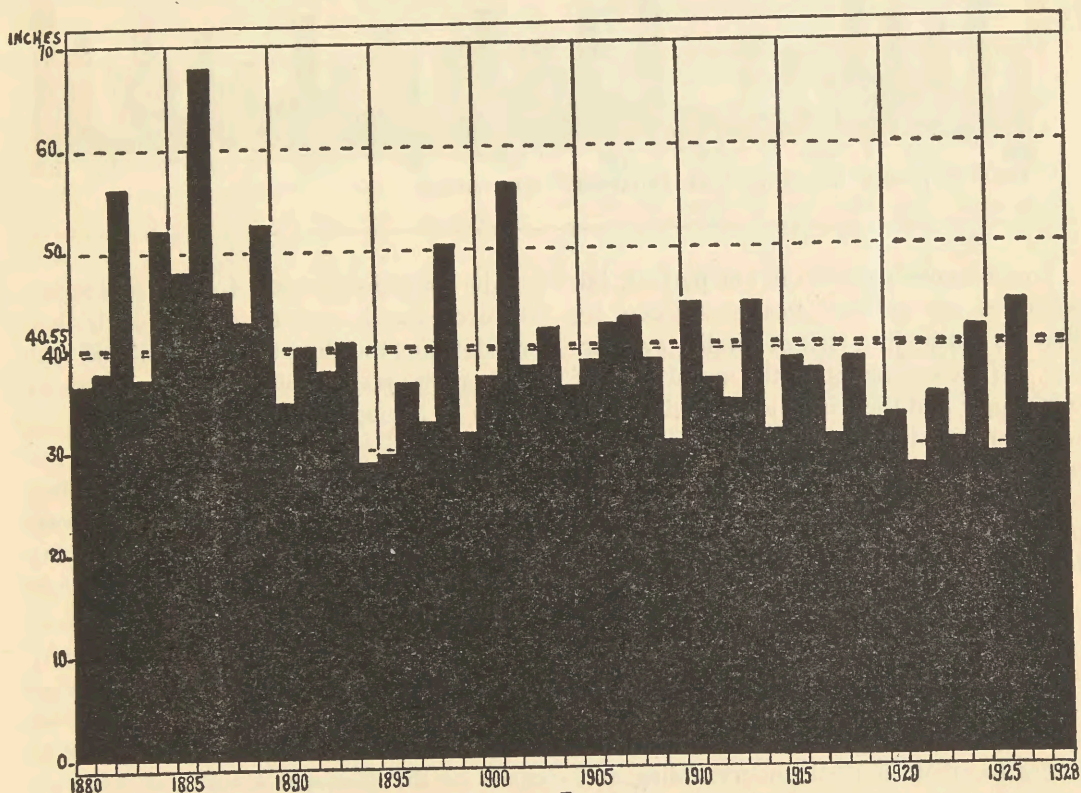


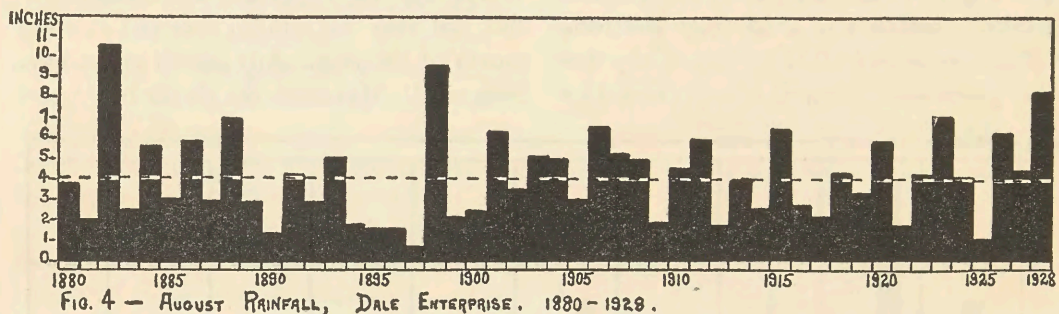
FIG. 3 — ANNUAL RAINFALL, DALE ENTERPRISE. 1880 - 1929.

was influenced by the dry conditions of that month in 1929. This record is represented in Fig. 4. The three highest rainfall records for the month are: 1882, 10.50 inches; 1898, 9.54 inches; and 1928, 8.29 inches. The three lowest records are: 1897, 0.68 inches; 1890, 1.26 inches; and 1925, 1.15 inches. The mean precipitation for August is 4.03 inches. In Fig. 4., this is indicated by the dashed line.

Following such a plan as this, a much longer study might be made but enough has been cited so that it seems very evident that the records of the Dale Enterprise station support the statement that the present climate is not changing. In the limitations of such an article as this, the records of only one weather station could be used as

illustrations. Any readers who wish to learn how well past records of other weather stations may support or refute the idea of the present climate not changing can easily make such a study. Address the Chief, Weather Bureau, Department of Agriculture, Washington, D. C. and ask for the Climatological Data for your nearest weather station, and the printed circular which includes your territory will be mailed to you free. It is to be expected that any study will give evidence of variations or fluctuations from the average or mean climatic conditions. As they are only fluctuations, they do not indicate a permanent change in climate.

RAUS M. HANSON



Our economic system is not perfect, but whatever our national weaknesses may be, they do not lie in a lack of vitality or courage. If we can maintain the moral fiber of our people and their individual initiative, if we can maintain equality of opportunity for our youth, if we maintain the strength of our government, we shall make even greater progress in the next century.—*Herbert Hoover*.

In the present state of the world, with evident proof that war is the greatest of all tragedies from which humanity suffers, the necessity for employing all educational forces to create mutual understanding and sympathy is obvious.—*John Dewey*.

The best preparation for the character required for democratic citizenship is that which trains the child to take a full and real share in the responsibilities of the groups to which he belongs.—*Henry Neumann*.

He who helps a child helps humanity with a distinctness, with an immediateness, which no other help given to human creatures in any other stage of their human life can possibly give again.—*Phillips Brooks*.

Thirteen percent of the high school principals in the United States are members of the Department of Secondary School Principals of the National Education Association.

THE VIRGINIA TEACHER

Published monthly, except August and September, by the State Teachers College at Harrisonburg, Virginia.

Entered as second-class matter March 13, 1920, at the postoffice at Harrisonburg, Virginia, under the act of March 3, 1879.



CONRAD T. LOGAN, *Editor*
HENRY A. CONVERSE, *Business Manager*
CLYDE P. SHORTS, *Circulation Manager*

ADVISORY BOARD

KATHERINE M. ANTHONY
FRED C. MAREE
BESSIE J. LANIER

Manuscripts offered for publication from those interested in our state educational problems should be addressed to the editor of THE VIRGINIA TEACHER, State Teachers College, Harrisonburg, Virginia.

EDUCATIONAL COMMENT

HISTORY COMMISSION

The Commission on Direction of the Investigation of History and Other Social Studies in the Schools, sponsored by the American Historical Association, at a meeting on November 7-8, in New York City, discussed and approved the proposed testing program under the direction of Truman L. Kelley. The proposed plan had previously been considered by the Advisory Committee on Tests.

The members of the Commission are: Frank W. Ballou, Superintendent of Schools, Washington, D. C.; Charles A. Beard, New Milford, Connecticut; Isaiah Bowman, American Geographical Society; Ada Comstock, Radcliffe College; George S. Counts, Teachers College, Columbia University; Guy Stanton Ford, University of Minnesota; Evarts B. Greene, Columbia University; Ernest Horn, University of Iowa; Henry Johnson, Teachers College, Columbia University; W. E. Lingelbach, University of Pennsylvania; Leon C. Marshall, Johns Hopkins University; Charles E. Merriam, University of Chicago; Jesse H. Newlon, Director, Lincoln School, New York City; Jesse F. Steiner, Tulane Uni-

versity; and A. C. Krey, *Chairman*, University of Minnesota.

The personnel of the different advisory committees thus far appointed and at work includes:

Advisory Committee on Objectives: Charles A. Beard; Boyd H. Bode, Ohio State University; Guy Stanton Ford; Charles E. Merriam; Harold Rugg, Teachers College, Columbia University; A. C. Krey.

Advisory Committee on Tests: Frank W. Ballou; Isaiah Bowman; Howard C. Hill, University of Chicago; Ernest Horn; Ben Wood, Columbia University; A. C. Krey, *Chairman*.

Advisory Committee on Public Relations: Frank W. Ballou; Ada Comstock; John A. Fairlie, University of Illinois; A. C. Krey; Robert S. Lynd, Social Science Research Council, New York City; Jesse H. Newlon, *Chairman*.

School administrators, teachers of the social studies, and other interested groups have been generous in assistance given to the staff of the Investigation. Communications from individuals who are interested in current activities of the Investigation should be sent to 316 Library, University of Minnesota, or 610 Fayerweather Hall, Columbia University, New York City.

FRENCH SUMMER COURSES

The University of Paris announces the 1930 French Summer Courses at the Sorbonne. Travel and study are combined to meet the needs of American teachers, and courses are evaluated for the transfer of credits to American colleges and universities. Courses are offered for those now holding the M. A. degree, as well as for those holding the A. B. degree. Full details are given in a recently published bulletin, copies of which may be had by addressing requests to M. L. Boss, 717 South Beech Street, Syracuse, New York.

\$200 IN HIGH SCHOOL PRIZES

\$100 for Best Student Paper; \$100 for School

The Commission on Interracial Co-operation, with headquarters at 409 Palmer Bldg., Atlanta, Ga., announces the offer of a cash prize of \$100 for the high school pupil submitting the best paper on "America's Tenth Man," and a prize of like amount for the school making the best use of the Commission's "Tenth Man" project. The contest is national in scope and all pupils of high schools and junior high schools are eligible to compete. It closes April 1, 1930. A 5,000-word pamphlet of source material has been prepared by the Commission and will be furnished free to any one interested, together with full information as to the conditions of the contest.

The announced purpose of these prizes is to encourage as widely as possible the study of the Negro's part in American history, which, according to the Commission, is much more interesting than is generally supposed. It is believed that such a study will be helpful to the children of both races, promoting more intelligent and objective attitudes on the one side, and developing wholesome pride of race on the other. The Commission asks the co-operation of high school principals and teachers, and also invites correspondence from pupils who may be interested.

A TIMELY PROGRAM FOR HIGH SCHOOL COMMENCEMENT

Current interest in the signing by 53 nations of the General Pact for the Renunciation of War (Kellog Treaty), the international acceptance of the Root formula for the entrance of the United States into the World Court, and the ratification by the Senate of the Pan-American Treaty of Conciliation makes the subject of peace the appropriate key-note of a high school commencement program. A list of Peace

material suitable for graduation exercises has been prepared by the Education Committee of the Pennsylvania Branch of the Women's International League for Peace and Freedom.

The source material includes music, Scripture reading, poems, and subjects for essays and speeches. It has been selected by practical classroom teachers and principals. The list is now ready for distribution and can be obtained, without charge, by application to the Women's International League, 1924 Chestnut Street, Philadelphia, Pa.

MODELING IN SOAP

Modeling figures in soap is one of the interesting and unusual methods employed by an Ohio school teacher to stimulate the interest of pupils in a class in English literature.

In the October issue of *The Ohio Teacher*, Miss Florence A. Alkire of Mount Sterling, Ohio, describes how the modeling in soap attracted her class.

"My class in English literature has been typical, I believe, of many groups throughout the state. Not all are brilliant or dull; not all are easily creative, but they find in an attempt at this sort of expression a release that they want. They can be active in this and they like it," Miss Alkire writes.

"This creative spirit was helpful in presentation of material on the early Miracle plays. There was shown to the group a picture representing a scene in an English village of the early fifteenth century on a busy market day when a play was being performed by a guild before the mayor.

"The class was asked, 'Can't we make a model of this?' 'Model' caught attention. At once the question came, 'Model? In what?' The answer 'Ivory Soap' was surprising and needed an explanation of many interesting models being made in this medium and of exhibits which included figures

and scenes for more elaborate than this would require.

"There were queries about materials and patterns; that was encouraging. The assignment for the following day was to bring to class a newspaper to protect desks, a sharp pen knife, an orange stick, a choice of subjects, and a cake of soap. . . .

"In response to 'Have you preferences?' there came from one boy, often slow to respond, 'Yes, I'll take the knight on horse-back.' Another boy interested in architecture asked to make the monument. . . Two conferred, and wished to make the guild hall; two others decided upon a row of houses. The girls preferred to attempt individual figures. There were unaccountable choices—the gayest choosing the nun, the meekest—the mayor, the wisest—a pig.

"The cutting required the school period and home work. The third class period spent in this project was given to final touches and arrangement of the figures on a piece of heavy brown paper which one of the students contributed to represent the street."

Other groups have been interested in modeling with soap as a medium through the annual competitions under the sponsorship of the National Soap Sculpture Committee. The sixth of these has just been announced.

The prizes this year amount to \$2,850, comprising awards in the amateur section amounting to \$1,850 and \$1,000 in the professional class. Foreign entrants will compete for special prizes totaling \$250.00. Information on the competitions and instruction in soap modeling may be had from the National Soap Sculpture Committee, 80 East 11th Street, New York City.

CHILD GUIDANCE

"Why should not parents take the responsibility of choosing a religion for their children?" asks Mrs. Herbert Brownell as she outlines in the December *Journal of the*

National Education Association methods by which parents may teach their children to appreciate their homes.

"Parents seem to forget that they didn't hesitate to choose each other as parents of their children," says Mrs. Brownell. "They dared choose where their children should live, what they should eat and wear, who their friends should be. They will choose schools for them, what books they shall read, but the poor little things are denied acquaintance with God. To me home without religion is like an automobile without a steering wheel. It may go, but where?"

Let Children Help

"Just try telling your two-year-old child each evening that he can pick up the paper that is on the porch and hand it to father when he comes home. What an achievement, and how he responds to the admiration his effort has brought. Let him do that regularly. He may get over the first thrills, but keep it up—that or some other service for a loved one. Don't be afraid of starting these acts of service too young.

"A definite thing for each member of the family to do in the daily routine of home-keeping is a real step in teaching appreciation of the home. It would be a real handicap in my method of teaching appreciation of home if everyone had plenty of money and could stock a home with every convenience and luxury.

"Perhaps the family as a whole longs for a radio. If each member of the family can save a little, each one earn a little, and all plan on the kind of radio they want, does anyone doubt that the radio will be appreciated when it comes into the home? If economy in the home must be practised, let the children know about it. It will be a matter of pride to care for furnishings and clothing so they may last and the money thus saved be used for other necessities. Family pride is a good kind of pride and makes for appreciation of family virtues and accomplishments."

THE READING TABLE

POULTRY

A WORKBOOK FOR STUDENTS IN POULTRY HUSBANDRY. By William Anderson Broyles and Arthur Don Wilson. N. Y.: Ginn and Co. 1929. Pp. 114. 80 cents.

This looseleaf notebook follows the contract plan and is intended to apply the subject matter of the standard texts to the laboratory conditions of poultry husbandry. The contracts are very practical and well chosen. Not only does it admirably fulfill its purpose, but it is also a good example of how to make and execute teaching contracts. One of the best things about it is the way the authors hew to the line. No essential activity is omitted; no irrelevant matter is included.

A set of twenty tests on the contracts is provided with the *Workbook*. G. W. C.

SUPPLEMENTARY

ENRICHED TEACHING OF ENGLISH IN THE HIGH SCHOOL. By Maxie N. Woodring and Rachel T. Benson. New York City: Bureau of Publications. Teachers College, Columbia University. 104 pp. 1927.

ENRICHED TEACHING OF MATHEMATICS IN THE HIGH SCHOOL. By Maxie N. Woodring and Vera Sanford. New York City: Bureau of Publications. Teachers College, Columbia University. 128 pp. 1928.

ENRICHED TEACHING OF SCIENCE IN THE HIGH SCHOOL. By Maxie N. Woodring, Mervin E. Oakes, and H. Emmett Brown. New York City: Bureau of Publications, Teachers College. 374 pp. 1928.

A set of source books for teachers "listing chiefly free and low cost illustrative and supplementary materials." High school teachers handicapped by poor library facilities will here find practical suggestions for enriching their subject matter at small cost. Each volume represents a comprehensive survey of its field brought down to date of publication. The annotations are clear and to the point. K. M. A.

FUNDAMENTAL BIOLOGICAL PRINCIPLES

BACKGROUNDS OF BIOLOGY. By John Giesen and Thomas L. Malumphy. Milwaukee: Bruce Publishing Co. 1929. Pp. 278. \$2.50.

This is not a biographical or historical text as the title might indicate, but is a treatment of the fundamental biological principles. The scope is indicated by the chapter headings, some of which are on cell structure, irritability, cell division, reproduction, environment and heredity, Mendel's laws, eugenics, disease, evolution, origin of life, infection, immunity, vertebrate organization, endocrine glands, the nervous system, and animal psychology.

It is an excellent text for freshman biology courses. If it not so used, it should be in every library as a reference for such courses. The authors have the happy faculty of clear concise presentation of their subject; this is calculated to give good preparation for more advanced work. The book would have been improved by at least a chapter on digestion and metabolism. For this reason, it will find its greatest usefulness as a preparatory text for classes in educational psychology. G. W. C.

WASHBURN INDIVIDUAL ARITHMETIC, BOOKS 1-5, with Teachers Manual, Correction Book, Test Book and Key. By Carleton Washburne and teachers and research department in the Winnetka Public Schools. World Book Co. Yonkers-on-Hudson. 40 cents each.

The aim of these books is to give children practice and independence in the fundamentals of arithmetic. The books are self instructive and self corrective. They have been carefully graded and checked in regard to children's difficulty and they represent the highest result of teaching experts and scientific knowledge.

M. L. S.

PAPER TOYS. By Anna E. Pauli. Peoria, Illinois: The Manual Arts Press. 1929. 60 pp. \$1.40.

Patterns for paper toys representing 36 characters from the literature of the primary and kindergarten grades, with brief instructions for making each. The "cat stairs," which is used for arms, legs, and tails, is the unique idea presented.

Like all patterns, this set may be very harmful, but used correctly might be "an inspiration for creative work" as suggested by Katherine Morris Lester in her foreword. One wonders, however, over the *why* of paper toys.

G. M. P.

ELEMENTARY PRINCIPALS OF EDUCATION. By Edward L. Thorndike and Arthur I. Gates. New York: The Macmillan Co. 1929. 335 pp.

A textbook for a first course in principles of education.

PRINCIPLES OF TEACHING AND LEARNING IN THE ELEMENTARY SCHOOL. By Lois Coffey Mossman. Boston: Houghton Mifflin Company. 1929. Pp. 292. \$1.90.

This is a welcome and valuable contribution to teaching in the modern elementary school, in which field there is still too little material. It is suggestive as to application and shows keen insight into the learning process. It includes practical discussions of the newest interpretations relative to teaching—discussions which can be readily understood even by the groping freshman. Chapter I, The Organization of Classwork on the Basis of Group Living, is, in itself, of considerable worth because of its clear, concise development in relation to the most recent professional thinking and practice in the group activity of the child. The chapters on the organization of materials are equally valuable. Altogether, it is a superior and stimulating piece of work which should find ready acceptance at the hands of all progressive elementary teachers.

B. J. L.

STORIES I LIKE WITH PICTURES BY ME. By Maud C. Stubbings and Genevieve M. Watts. Chicago: Hall and McCreary Company. 1929. Pp. 63. 24 cents a copy, or \$2.60 a dozen, post-paid.

This is a new type of work book in silent reading. In contrast to the traditional formal jobs almost bare of meaning for the child, the authors build the work around six famous children's stories. Intended for second grade. Perforated so that a loose-leaf book can be made of it.

K. M. A.

READINGS IN EXTRA-CURRICULAR ACTIVITIES. By Joseph Roemer and Charles Forrest Allen. Richmond: Johnson Publishing Company. 1929. 844 pp.

A well planned source book in extra-curricular activities. Includes no materials from textbooks or other bound volumes.

SELF-IMPROVEMENT: A STUDY OF CRITICISM FOR TEACHERS. By Sheldon Emmor Davis. New York: The Macmillan Co. 1929. 280 pp.

A handbook for the classroom teacher who wants a check up on her work. Several very valuable chapters.

TRAINING CHILDREN TO STUDY. By Bessie W. Stillman. Boston: D. C. Heath and Company. 1928. Pp. 247. \$1.60.

Here is specific help for the classroom teacher who aspires to train her middle grade or high school pupils to think. Clean-cut exposition enriched by first hand illustrative material make the book very readable. Particularly good suggestions on securing and organizing data for problem solving.

K. M. A.

THE FAMILY AND ITS SOCIOLOGICAL ASPECTS. By James Quayle Dealey. Boston: Houghton Mifflin Company. 137 pp. \$1.00.

This book has its place in the study of human relationships. It gives briefly those factors in the

history and development of the family that are so essential to an understanding of family problems today.

WHOLESOME MARRIAGE. By Ernest R. Groves. Boston: Houghton Mifflin Company. 1927. 239 pp. \$2.00.

The authors have treated in a very sane way those relationships within the family circle. They show the need of scientific research on family problems as a means of indicating the paths which we should follow in adjusting our family ideals and habits amid the changing social standards of our day.

FAMILY LIFE TODAY. Edited by Margaret E. Rich. Boston: Houghton Mifflin Company. 1928. 244 pp. \$2.50.

This is an excellent study of those social relationships with which the family life is concerned. It seems especially good in that it analyzes present-day problems and suggests means of solving the dangerous situations involved.

PERSONALITY ADJUSTMENTS OF SCHOOL CHILDREN. By Caroline B. Zachry. New York: Charles Scribner's Sons. 1929. Pp. 304.

The duties of the classroom teacher in this day and age do not end when the prescribed reading, writing, and arithmetic have been taught. The teacher must know whether John is troublesome or over-conscientious or too dependent or over-anxious, and some of the reasons for the condition so that he may be helped out of it instead of into it.

Miss Zachry has made an extensive study of children's behavior, and this contribution based on actual experiences gives the teacher and parents a background for the better understanding of the troublesome child.

THE CHRISTOPHER ROBIN READER. By A. A. Milne. New York: E. P. Dutton and Co. 1929. Pp. 171. \$1.25.

In this collection the author has combined such choice selections as Half Way Down, The Little Black Hen, and In Which Tigger Comes to the Forest and Has Breakfast, from *When We Were Very Young*, *Now We Are Six*, *Winnie-the Pooh*, and *The House at Pooh Corner*.

While it can not be used as a reading book in the classroom, one or more copies ought to be included in every school library for the children to enjoy at will.

EXPLORERS AND FOUNDERS OF AMERICA. By Anna Elizabeth Foote and Avery Warner Skinner. (Revised Edition.) New York: American Book Company. 1929. Pp. 310.

Thirty-four character sketches containing the material for a year's work in American history for grammar grades. Each character is a representative type of a period of activity or a phase of the country. The book is well illustrated.

GREGG SPEED STUDIES. By John Robert Gregg. New York: The Gregg Publishing Co. 1929. Pp. 314. \$1.20.

A companion text to the Gregg Shorthand Manual, Part I being perfectly correlated with it.

This will assist teachers of shorthand theory to develop speed from the first lesson on the principles. The presentation of reading and dictation material in its shorthand form instead of in print, as is done in most shorthand dictation books, is the outstanding feature of this text.

STORIES OF PIONEER LIFE. By Florence Bass. (Revised edition.) Boston: D. C. Heath and Company. 1928. Pp. 164.

Entertaining stories about the early days in the Central States, with rare and instructive illustrations. A great many interesting details that are not usually accessible will be found here: digging "sang," coins called the "fip" and the "bit," greased paper windows, how to pound corn in a tree stump, Indian mounds, traveling preachers, hunters and their camps, and no end of such material.

THE TECHNIQUE OF TEACHING TYPEWRITING. By Jane E. Clem. New York: The Gregg Publishing Co. 1929. Pp. 363.

Intended as a textbook for students training to become teachers of typewriting, and for private study by teachers already in the field. This book deals in a concrete and practical way with the underlying principles of typewriting, instruction, keeping uppermost in mind modern educational psychology, especially the learning and teaching process. The chapter on "The Typewriting Teacher" might well be read by teachers of other subjects, as it gives an excellent description of *real teachers*.

BOOKKEEPING EXERCISES (First Year). By R. G. Smolin. New York: Globe Book Co. 1929. Pp. 131. List price 67 cents; class price 50 cents.

Fills requirements for first year bookkeeping as offered in accredited schools. This book is full of excellent material for class work and home assignments. The arrangement is simple, and the transactions are short but complete. There are drill exercises in each topic to be covered.

BOOKKEEPING EXERCISES (Second Year). By Nathaniel Filfus. New York: Globe Book Co. 1929. Pp. 171 plus specimen examinations. List price 67 cents; class price 50 cents.

Should be of great value in preparing students for examinations in bookkeeping and accounting. The practical topics are so arranged that they can be referred to readily.

MODERN TYPEWRITING. By Henry J. Foley. New York: Globe Book Co. 1929. Pp. 125. List price, \$1.80; class price, \$1.35.

This text and practice book is based upon the habit formation method of learning typewriting. It is progressively arranged, each lesson being a psychological development based upon the preceding lessons and a preparation for the subsequent ones. It contains scientifically planned fingering exercises and a series of tests covering individual elements of skill.

NEW OF THE COLLEGE AND ITS ALUMNAE

With the appearance of the new girls on campus, the New Girl-Old Girl wedding was solemnized, welding the classes into one student body. The ceremony held on October 9 was performed by Mina Thomas, president of student government, marrying Helen Lineweaver, president of the senior class, to Doris Anderson, elected from the freshman class as the bride. Bridesmaids, chosen from the freshman class, were Betty Stone, Mary Dove, Dorothy Harley, Lillian Hicks, Marie Coffey, and Martha Franklin. Groomsmen were Mary Brown Allgood, Evelyn Bowers, Suella Reynolds, Edna Campbell, Elizabeth Ramsburg, and Ida Hicks. Mildred Coffman was best man.

The Old Girl-New Girl game, netting a victory of 51-5 for the old girls, was played October 11. Both teams, characterized by pep and enthusiasm, displayed good team work.

New members of organizations initiated during the quarter are as follows:

Lanier Literary Society—Rebecca Holmes, Maxine Pointer, Mary Betty Rodes, Dorothy Rodes, Louise Harwell.

Lee Literary Society—Shirley Miller, Virginia Adkins, Elizabeth Woods, Virginia Allen, and Catharine Wherrett.

Page Literary Society—Frances Snyder, Grace Blalock, Martha Warren.

Stratford Dramatic Club—Virginia Thomas, Iva Lou Jones, Florence Dickerson, Mina Thomas, Rebecca Holmes, Pauline Efford, Robbie Quick, Isabell Duvall.

Glee Club—Audrey Cassell, Helen Wick, Shirley Miller, Elizabeth Downey, Marguerite Smithy, Verice Stephenson, Eleanor Moore, Gertrude Drinker, Frances McGhee, Virginia Adkins.

Le Cercle Français—Dorothy Wright, Mary Swartz, Gertrude Rust, Newell Dunn.

Debating Club—Clara Payne, Catharine Wherrett, Doris Petty, Mildred Blanks,

Virginia Harrison, Grace Epperson, Elizabeth Krouse, Eleanor Wrenn, Martha Simpson, Josephine Wooding, Elizabeth Dawson, Eloise Thompson, Nelle Taylor, Marguerite Smithey.

Cotillion Club—Kathryn Markman, Virginia Moss, Rebecca Emory, Mildred Coffman, Bobbie McKim, Sally Bishop Jones, Elizabeth Coons, Lucy Marston, Rachel Brothers, Jacquelyn Johnston, Grace Kerr, Mary Farinholt, Virginia Lee Strailman, Doris Petty.

Kappa Delta Pi—Gertrude Drinker, Ruth Frankhouser, Margaret Kelley, Linda Malone, Lena Wolfe, Jane Campbell, Carrie Dickerson, Virginia Gilliam, Shirley Miller, Virginia Stark, Anne Trott, Lois Winston.

Among the entertainments for the freshmen and opening services of organizations were the Athletic Association's Hallowe'en party, the Cotillion dance, and the Y. W. C. A. candle-light service.

The first hockey game of the season, played at Sweetbriar October 26, resulted in a loss for Harrisonburg, the score standing 4 to 1 in favor of Sweetbriar. Playing Westhampton College November 9 at Richmond, H. T. C. won by a score of 5-4. Meeting George Washington University here on a snow-swept field November 23, the local team won by a score of 6-1. The fourth game of the hockey season brought another victory to the local team, when they defeated the Alumnæ team with a score of 3 to 2. The entire season was marked by brilliant team work and clever playing for the H. T. C. team.

Doris Clarkson, of Roselands, enjoys the distinction of being the first Harrisonburg student to go home for the week-end by airplane. Armed with special permission from her parents, Miss Clarkson "took off" and was at home in twenty minutes. Roselands is near Lynchburg.

The senior class established its seniority through a chapel program on October 28. President Duke, Helen Lineweaver, presi-

dent of the class, and Mary Crane, vice-president, all spoke; a class song by Dr. Wayland was sung, and a poem by Phyllis Palmer was read.

The Smallman a Cappella Choir, appearing here November 1, represented the first number on the lyceum course. The choir, composed of about thirty people, gave a brilliant performance. It is on its first transcontinental tour, coming from Los Angeles, California.

Of general interest is the newly established Johnston Memorial Fund, offered by the H. T. C. Alumnæ Association as a loan to girls needing money to further their education at the college.

The student body again participated in the Armistice Day celebration, marching in the parade sponsored by the local American Legion Post.

The fall production of the Stratford Dramatic Club, presented November 16, was "Cousin Kate," a comedy in three acts, by H. H. Davis. It was pronounced one of the most attractive and well-acted plays ever presented here by the Stratfords. Those playing were Mary Crane, Phyllis Palmer, Mildred Coffman, Rose Hogge, Rebecca Holmes, Elizabeth Knight, and Elizabeth Hopkins.

The annual Red Cross drive of H. T. C. resulted in the sum of \$150. During the drive Miss Louise Boje, head of the college committee, with Sally Bishop Jones and Nellie Cowan representing the student body, attended the preliminary meeting at Lexington. Featuring the drive also was a talk given by Dr. Thomas E. Green, Director of Speaking Service for the American National Red Cross. The drive was formally opened with an address given at the chapel hour on Armistice Day by Rev. Dr. B. F. Wilson, pastor of the Presbyterian church in Harrisonburg. The college Red Cross organization was also represented by a float in the Armistice Day parade.

The Schoolma'am photographic work is

being done by the White Studios of New York this year. Mr. Andrew McClurg, representative, has just finished taking the class pictures.

On November 23, the first fall dance to be given here was sponsored by the Bluestone Cotillion Club. The attendance was not large, but the dance was highly successful. Music was furnished by the Maryland Serenaders of Hagerstown.

Harrisonburg sent delegates to the meeting of the Virginia Intercollegiate Press Association, Frances Snyder representing the *Breeze*, Virginia Gilliam and Anne Trott representing the *Schoolma'am*. The convention this year was held at Blacksburg and Radford on November 22 and 23.

Thanksgiving holidays were granted for Wednesday and Thursday, November 27 and 28. A great number of the student body went away for that time, a great number of the faculty being absent from the campus also to attend the convention of the Virginia Education Association held at Richmond. During the meeting, which lasted from November 26 to 30, Mr. W. H. Keister, Miss Alice M. Aiken and Miss Julia Robertson were among the speakers. In the absence of the president, Miss Elizabeth P. Cleveland, vice-president of the English section, presided over this meeting on Friday.

DIRECTORY OF STUDENT OFFICERS

FALL QUARTER, 1929-30

STUDENT GOVERNMENT ASSOCIATION

Mina Thomas, president; Juanita Beery, vice-president; Virginia Stark, secretary-treasurer; Ruth Sisson, recorder of points.

Y. W. C. A.

Elizabeth Dixon, president; Gertrude Drinker, vice-president; Nellie Cowan, secretary; Jeanette Ingle, treasurer.

ATHLETIC ASSOCIATION

Elizabeth Coons, president; Esther Smith, vice-president; Elizabeth Ramsburg, secretary; Irene Garrison, treasurer; Mary Watt, business manager.

PUBLICATIONS

The Schoolma'am—Anne Trott, editor-in-chief; Virginia Gilliam, business manager.

The Breeze—Phyllis Palmer, editor-in-chief; Frances Synder, business manager.

SOCIETIES

Kappa Delta Pi—Elizabeth Kaminsky, president; Elizabeth Knight, vice-president; Mary Crane, secretary-treasurer.

Stratford Dramatic Club—Mary Crane, president; Elizabeth Hopkins, vice-president; Elizabeth Knight, secretary; Rose Hogge, treasurer; Mildred Coffman, business manager.

Lanier Literary Society—Helene Duvall, president; Fan Bell, vice-president; Sally Bishop Jones, secretary; Mary Farinholt, treasurer; Virginia Lee Strailman, chairman of program committee.

Lee Literary Society—Mary Brown Allgood, president; Vivian McDonald, vice-president; Frances Rolston, secretary; Anabel Miller, treasurer; Elizabeth Knight, chairman of program committee; Kennie Bird, sergeant-at-arms.

Page Literary Society—Gertrude Drinker, president; Isabelle Duvall, vice-president; Anna Keyser, secretary; Estelle LaPrade, treasurer; Kathryn Markham, chairman of program committee.

Alpha Literary Society—Mae Brown, president; Julia Duke, secretary.

Æolian Music Club—Shirley Miller, president; Nellie Cowan, vice-president; May Coffman, secretary; Linda Malone, treasurer; Pearl Nash, chairman of program committee.

Choral Club—Mildred Coffman, president; Katharine Wherrett, vice-president; Lucy Malone, secretary; Frances Rolston, treasurer; Betty Stone, librarian.

Glee Club—Edna Brown, president; Harriet Pearson, vice-president; Arabella Waller, secretary; Garnet Hamrick, librarian; Emily Wiley, business manager.

Bluestone Orchestra—Sara Ellen Bowers, president; Catherine Twyford, vice-president; Estelle LaPrade, secretary-treasurer.

Frances Sale Club—Elizabeth Woods, president; Frances Matthews, vice-president; Edith Glick, secretary; Pauline Carmines, treasurer; Gladys Dixon, chairman of program committee.

Cotillion Club—Bess Cowling, president; Rose Hogge, vice-president; Virginia Thomas, secretary; Irene Garrison, treasurer; Dorothy Townsend, business manager.

French Circle—Jane Campbell, president; Elizabeth Downey, vice-president; Eleanor Wrenn, secretary; Eva Holland, treasurer; Evelyn Timberlake, chairman of program committee.

Art Club—Helen McNeely, president; Margaret Beck, business manager; Pauline Carmines, secretary and treasurer.

Euclid Club—Alice Elam, president; Mary Anne Nichols, vice-president; Lillie Blankenbaker, secretary; Helen Blankenbaker, chairman of program committee.

Debating Club—Margaret Kelly, president; Isabelle Duval, vice-president; Garnet Hamrick, secretary; Henri Steinmetz, business manager and treasurer.

High School Club—Martha Warren, vice-presi-

dent; Lillie Blankenbaker, secretary; Pauline Efford, treasurer.

The Scribblers—Frances Snyder, chief scribe.

CLASSES

Senior Class—Helen Lineweaver, president; Mary Crane, vice-president; Anabel Miller, secretary; Evelyn Bowers, treasurer; Elizabeth Woods, business manager; Ida Hicks, sergeant-at-arms.

Junior Class—Lois Winston, president; Evelyn Wilson, vice-president; Dorothy Rodes, secretary; Elizabeth Oakes, treasurer; Virginia Thomas, business manager; Nellie Cowan, sergeant-at-arms.

Sophomore Class—Harriet Ullrich, president; Sally Bishop Jones, vice-president; Mary Farinholt, secretary; Martha Mason, treasurer; Julia Duke, business manager; Katharine Wherrett, sergeant-at-arms.

Freshman Class—Janet Lowrie, president; Reba Lawson, vice-president; Dorothy Needy, secretary; Barbara Stratton, treasurer; Betty Marie Coffey, business manager; Laura Melchor, sergeant-at-arms.

ALUMNAE NOTES

HARRISONBURG ALUMNÆ CHAPTER HOLDS SPLENDID MEETING

The annual Harrisonburg Local Alumnæ Chapter held its meeting in the College Tea Room the ninth of November. There were forty present at this affair. The decorations of the banquet table carried out the Thanksgiving idea, with a huge paper turkey as a center piece and miniature pilgrims for favors. Mrs. Garber, alumnæ secretary, presided and introduced Mrs. W. B. Varner, dean of women, who welcomed the girls back home saying that it was an inspiration to the girls in school and a satisfaction to the faculty to know that the alumnæ had such an abiding interest in the school. An interesting program was presented by the several members of the Art and Glee Clubs.

Officers of the club were elected as follows: Bertha McCollum, president; Ruth Harris, vice-president; Mrs. Johnston Frisette, secretary; Edna Dechert, treasurer. The speaker of the evening was the President of the College, Mr. Duke, who urged the alum-

næ to be present in Richmond on Thanksgiving.

Toward the end of the evening the banquet was turned into a business meeting, which was conducted by the new president of the club, Miss McCollum, who read an original humorous review of the work done during the past year. After several plans had been formulated for raising money for the Johnston Memorial Fund and for a varied program of entertainment, an expression of thanks was given Ruth Harris, who was responsible for the table decorations.

PORTSMOUTH ALUMNÆ STEP TO THE FRONT

The regular monthly meeting of the Portsmouth Chapter was held at the home of Mattie Worster, on Court street at which forty alumnæ were present. Plans were discussed for the annual Christmas shop to be held in December. After the business meeting, cards were played, Mrs. Alberta Rodes Shelton winning high score and Mrs. Bernice Gay Euler drawing the consolation. Under the able direction of the new president, Mattie Worster, the Portsmouth Alumnæ Chapter has been one of the most active chapters in the state.

FRANKLIN COUNTY ALUMNÆ ORGANIZE

Miss Pearl Phillips, the new president of the alumnæ in Franklin County, reported the organization of an H. T. C. Alumnæ Club at a recent teachers' meeting. We are glad to welcome this club into our association and know that it will give us its support and co-operation.

FIFTY-SIX PRESENT AT ALUMNÆ BANQUET IN RICHMOND AT THANKSGIVING TIME

The regular meeting of the H. T. C. alumnæ was held at the Richmond Hotel

on Wednesday, November 27. In the absence of the general secretary, Mrs. Garber, Miss Sarah Elizabeth Thompson, new president of the Association, took charge of the affair. The banquet table was decorated with turkeys made of pine cones, a large turkey of crepe paper for the center piece and huge yellow chrysanthemums as well as purple candles, crepe paper, etc. Miss Gladys Lee, president of the Richmond Chapter, presided and welcomed the alumnae to Richmond. Miss Cleveland responded. Mrs. Moody read the telegram of good wishes sent by alumnae and college. Mr. Duke gave a very delightful talk, stressing the possibility of the liberal arts college for Harrisonburg. He also explained the absence of the alumnae secretary, who was at that time ill with flu. Many of the faculty members attended the banquet.

WEDDINGS

Miss Elizabeth Harper and Mr. Neil Morris, of Waverly, Tennessee, were married on Saturday, November ninth, at the Methodist Church, Baltimore. Miss Harper graduated from H. T. C. in 1925 and has been teaching in Lakeland, N. J.

Miss Margaret Martin, class '21, was married on August 20 to Mr. J. Norman Kirby of Egg Harbor, N. J.

MERLA MATTHEWS' PICTURE AT LANGLEY

At a regular weekly assembly of Langley Junior High School, Washington, D. C., on Friday, October 11, the Girls' Athletic Club presented to the school a picture of Miss Merla Matthews, who was director of physical education for girls at Langley for several years. The presentation was made by Miss Janet Hauser, who paid a touching tribute to the memory of her former teacher, who lost her life in a tragic accident on the Potomac last May. In accepting the picture for the school Mr. Holmes,

the principal, dwelt upon two outstanding characteristics of Miss Matthews—her devotion to duty and loyalty to the school she served so capably, and exhorted the hundreds of boys and girls in attendance at Langley to emulate her example.

The picture will hang in the library. Miss Matthews was a four year graduate of H. T. C., of the class of '20. She also received her degree at George Washington University and was a student at Columbia University, University of Virginia, and Northwestern University, Evanston, Ill.

DIED

Miss Geneva Moore, class '16, died at the Elizabeth Buxon Hospital, Newport News, the first of November.

PERSONALS

Aline B. Anderson, class '23, is teaching third and fourth grades, Brownsburg, Va.

Edna Anderton, class '17, is now Mrs. John E. Kritzer. Edna writes that she is keeping the home fires burning. Her address is 317 63rd St., Newport News, Virginia.

Mrs. Hilda Benson Henshall, class '12, is living at 7227 Blair Road, Tacoma Park, D. C. She writes that she is interested in helping to organize an alumnae chapter in Washington.

Helen E. Booth, class '26, has a position as a stenographer in Danville, Virginia.

Elsie Lyle Burnett, class '24, is teaching Home Economics in the Petersburg High School. She is also teaching at the night school.

Annabel Dodson, class '23, is teaching kindergarten in Norfolk, Virginia.

Martha F. Garbee, class '26, sent in \$4.00 for back dues. (Thanks!) Martha is teaching sixth grade at Kernersville, North Carolina.

Audrey Girard Harvie, class '18, in ad-

dition to keeping house is teaching English and literature in a junior high school in Richmond. Her address is 206 N. Lombardy street.

Ray L. Hanger, class '19, is a photo librarian in New York. Her business address is 4518 42nd street.

Mary Lucille Harrison, class '24, writes a very complimentary letter about the alumnae association. Lucille is teaching fifth grade in Alexandria, Virginia.

Sue Raine, class '23, is teaching Home Economics in Elon College, North Carolina.

Grace Showalter, class '21, is teaching kindergarten in Scranton, Pennsylvania.

Ada Lee Berrey writes from Charlottesville, "I had no idea there were a hundred in the graduating class for this year. That is quite a jump from our class—the first class—we were only ten! That was ten long years ago, however."

Thelma Eberhart writes from her home in Norfolk. "The Alumnae Section of the VIRGINIA TEACHER has been very interesting to me. I immediately turn to the back with the hopes that there will be several pages devoted to us. I went to Lake Prince on a picnic the other day and seeing the laurel in bloom there made me think of Rawley Springs in the spring and of the happy week-ends that I spent there. Have the girls really a cottage that belongs to the school? Tell all of the H. T. C. folks that know me that I am thinking of them and am longing to be with them again."

Lillian V. Gilbert, who now is in Nashville, Tenn., writes: "I am home-sick for Bluestone Hill. There is no place like it." She wishes to be remembered to all her friends here.

Helen Ward informs us that the Chesterfield County Alumnae Chapter has been reorganized. The officers are as follows: President, Helen Ward; Vice-President, Is-sie Gresham; Secretary-Treasurer, Maizie Aistrop.

Lila Lee Riddell is teaching this year at Belhaven College, Jackson, Miss. She assures us of her "love and devotion to H. T. C., and my heartiest co-operation in upholding the good work of the Alumnae Association."

Alice Denby, 910 Raleigh Ave., Norfolk, Va., sends a contribution to the Memorial Fund and the message "I am so glad to be given the opportunity to make a little contribution to the James C. Johnston Memorial Fund. I do hope there will be many contributions towards this appropriate memorial."

Anice Adams is now Mrs. Willard Dodson. Her address is Lone Oak Apartment, Danville, Va. "We have a very adorable baby daughter that arrived on December 22, 1928, and she seems to occupy just about every minute I have. Her name is Mary Elizabeth. It would give me so much joy to get back for commencement and greet old friends. Perhaps next year I shall have that great pleasure."

Pauline Layman, who is now Mrs. Prickett and who is living in Bluefield, W. Va., has a baby daughter. "You should see our four weeks old baby. We think Patty is the finest, smartest baby in the world. We are quite proud of her. Mary Garden's sister, Virginia, is teaching Home Economics here in Bluefield. She is very much like Mary."

Carolyn Ruan Beebe, of Stillman Valley, Ill., expected to attend her class reunion this year, but wired at the last minute that she could not come. This is her message.

"Dear Alumnae Secretary, I'm distressed as I can be,

To send to you my deep regrets for the banquet at the TEE.

I'd love to see old Blue Stone Hill and our class of one and four,

And hear the lark on Maypole Hill and reunite love once more."

Mrs. Elizabeth Leftwich Bailey, of 2025 Elmwood Ave., Lynchburg, sends money

for Life Membership and writes: "H. T. C. has a very real place in my heart, though you may think I do not always make it known promptly. It is precious to me."

Helen N. Leitch, of Columbus, Ohio, expected to attend the reunion of her class last June, but found at the last minute that she would not be able to attend. She sent a special letter to her classmates of 1924.

"Dear Classmates of 1924:

"I hope you are having a lovely time and I am so sorry that I can't come. I was counting on it and on seeing you all. Do you remember the first Sunday night when we were eating our supper from the paper bags? And Science Hall caught fire? And how the brave firemen came out and put it out? Didn't Clotilde Rodes remember the fire extinguisher? Everything seemed to happen on Sundays. One night in Spotswood when we were all resting quietly, the fire alarm rang loudly, and we all rushed out and found a man standing there. Remember? It wasn't leap year then. How proud we were of Nickell's team that beat all the others! Was it that year that Radford came and wore smoky-green uniforms? The game ended in a tie. I remember the nice dances we had when Edna Draper was there with her orchestra. There are so many happy things left from my years there! Have a lovely grand time!"

Hazel Davis writes of her work in Washington. "For nearly three years I have been with the research division of the National Education Association as a research assistant. My special assignment is to run a sort of information service in which 250 school systems are enrolled on an annual subscription basis, and I have to build up the subscription list, send them publications, and answer their questions. It keeps me reasonably busy."

HELEN HEYL IN NEW YORK

In the June issue of *New York State Education* announcement is made of editor-

ial plans for the coming session. Among the features is a series of articles by Helen Hay Heyl, who graduated from the two-year course here in '19. The cordial regard in which Helen Heyl is held in New York State is most pleasing to her old friends here.

No "outsider" has ever been given a more cordial welcome in New York State than Miss Helen Hay Heyl, state supervisor of Rural Education. Coming to us from her beloved Virginia, Miss Heyl has displayed an extraordinary sympathetic understanding of our peculiar rural school conditions and has already been a real force in raising the level of the daily performance in many of our rural schools. One of our besetting sins has been to put off doing this or that for the boys and girls in the country until we should have some new-fangled organization or some new unit of taxation or administration. Miss Heyl believes in improving the teaching in every rural school today, no matter how or where it is situated. That is a philosophy which promises help to the present generation. Miss Heyl will conduct a series of heart-to-heart "Talks With Rural Teachers," which we believe will set a new high standard for our columns.

Nothing carries greater hope than the study of child life.—*Henry Dwight Chapin.*

OUR CONTRIBUTORS

M. DORISSE HOWE is an associate professor of biology in the State Teachers College at Harrisonburg. Miss Howe received her doctor's degree from the University of Chicago and the master's degree from Syracuse University.

RUTH PHILLIPS is professor of biology at Harrisonburg. Dr. Phillips is a graduate of Syracuse University. She is author of *A Textbook of Vertebrate Embryology* (Lea and Febiger) and of numerous magazine articles.

SADIE S. WILLIAMS is an instructor in biology in the Washington-Lee High School, Arlington County, Virginia. She received her Bachelor of Science degree from the State Teachers College at Harrisonburg.

G. W. CHAPPELEAR is professor of biology in the State Teachers College at Harrisonburg, and head of the department.

BERTHA WITTLINGER is associate professor of biology at Harrisonburg, now on leave of absence and doing graduate work in Teachers College, Columbia University.

RAUS M. HANSON is associate professor of social science. He is a graduate of Nebraska Wesleyan and of the University of Nebraska, and has done graduate work in the University of London.

THE VIRGINIA TEACHER

WE PROTECT YOU. We are big enough to take care of your wants. If you see anything advertised by any firm in the Valley of Virginia, we believe we can furnish it for the same price—or less. Send us the advertisement and we will see that you get it through our Mail Order Department. Write us for prices and samples. *Special prices to the Faculty and College Students.*

B. NEY & SONS
Harrisonburg, Va.

DR. W. L. BAUGHER
DENTIST

Harrisonburg :: :: Virginia

BURKE & PRICE
FIRE INSURANCE

Harrisonburg, Va.
National Bank Bldg. Phone 16

HARRISONBURG BUILDING and
SUPPLY CO., INC.
Contractors and Builders
Harrisonburg, Virginia
O. M. Masters, *President*
W. E. Fry, *Gen'l. Mgr.*

HINKELS
EXPERT SHOE REPAIRING
West Market Street at Liberty

Work of Quality
FOLEY'S SHOE HOSPITAL
117 E. Market St. Phone 418-W
WE CALL FOR AND DELIVER
ANYWHERE IN THE CITY

FOREST E. PETERS
Make a Specialty of
WATCH REPAIRING
E. Market St. :: Harrisonburg, Va.

JOS. NEY & SONS CO.
THE BEST DEPARTMENT STORE
IN HARRISONBURG, VIRGINIA

Your Prosperity is Important to This Bank

We want every member of this community to prosper.

Even though you may do no business with us direct, your prosperity is an advantage to the community and consequently to us.

If we can help, with advice or service, please remember that we are cheerfully at your command.

You may correctly count us **YOUR FRIEND.**

The Rockingham National Bank

Harrisonburg, Virginia

THE STATE TEACHERS COLLEGE

HARRISONBURG, VA.

MEMBER ASSOCIATION OF COLLEGES AND SECONDARY SCHOOLS OF THE
SOUTHERN STATES

CLASS "A" MEMBER AMERICAN ASSOCIATION OF TEACHERS COLLEGES

Established by the General Assembly 1910.

Annual enrollment, 1,300.

Faculty of 60 well-trained and experienced college teachers.

Located in the Shenandoah Valley.

Elevation 1,300 feet.

Campus of 60 acres.

Beautiful mountain environment.

Fifteen college buildings.

Total value college plant, \$1,200,000.

Both city and rural training schools.

Athletic field and tennis courts.

Two gymnasiums. Nine-hole golf course.

Two swimming pools (indoor and outdoor).

Harrisonburg is a delightful and progressive city of 7,000 inhabitants, people of culture and refinement, deeply interested in the welfare of the College and its students.

Apply to THE PRESIDENT